IPC Series

BOX-PC
for IPC-BX950 Series
User's Manual

CONTEC CO.,LTD.

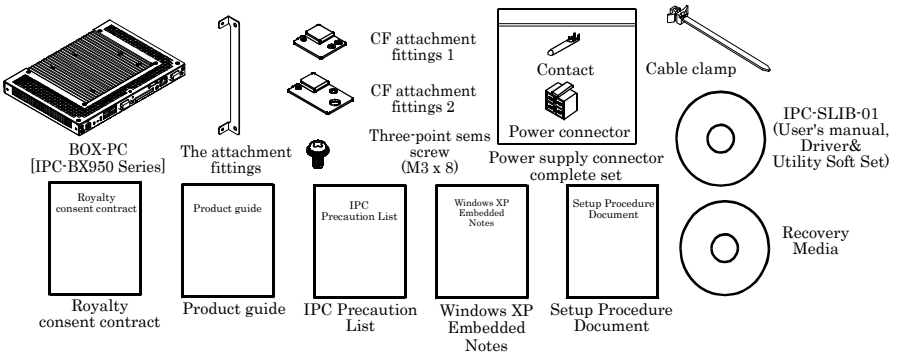
Check Your Package

Thank you for purchasing the CONTEC product.
The product consists of the items listed below.
Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.
Product Configuration List

Name	IPC-BX950Tx-DCxx0 Pcs.	IPC-BX950Tx-DCxxF Pcs.
BOX-PC	1	1
The attachment fittings	2	2
CF attachment fittings 1	2	1
CF attachment fittings 2	1	1
Screws for attachment fittings Three-point sems screw (M3 x 8)	6	5
Power supply connector complete set		
Power connector	1	1
Contact	4	4
Cable clamp	1	1
Product guide (this sheet)	1	1
IPC Precaution List	1	1
Royalty consent contract	None	1
Setup Procedure Document	None	1
Notes on using Windows XP Embedded	None	1
IPC-SLIB-01 *1 (User's manual, Driver & Utility Soft Set)	1	1
Recovery Media	None	1

*1 Please confirm latest information on the CONTEC homepage though the user's manual is stored in IPC-SLIB-01.

Product Configuration Image



* See the Product Configuration List to check if all the components are included for the specified number of units.

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1. Introduction

About the Product

This product is a fan-less embedded computer (BOX-PC (R)) packaged in a slim chassis of 25mm. IPC-BX950T1 series, which have the 1.20GHz ultra low voltage Intel (R) Core (TM) Duo processor, 945GME chip set, and 1GB or 2GB DDR2 SDRAM memory, achieve a high-level computing and drawing ability.

IPC-BX950T2 series have the 1.06GHz ultra low voltage Celeron (R) M processor, 945GME chip set, and 512MB DDR2 SDRAM memory.

IPC-BX950T3 series, which have the 1.66GHz ultra low voltage Intel (R) Core (TM) Duo processor, 945GME chip set, and 1GB DDR2 SDRAM memory, achieve a high-level computing and drawing ability.

Adopting air-cooling system using a large heat sink (fan-less) and CF card as its storage device (bootable), this product achieves high levels of reliability and quietness. It also includes a variety of extended interface such as 1000BASE-T, USB2.0, or serial.

Embedded-type CPU and chip set have been adopted. The use of readily available parts ensures the ease of the use of the product. In addition, the use of Contec-customized BIOS allows support to be provided at the BIOS level.

BOX-PC (R) series is available in the following eight models:

- Base model with Core Duo Processor 1.20GHz
  IPC-BX950T1-DC500 (DDR2 SDRAM 1GB, without OS, CF)
- OS-installed base model with Core Duo Processor 1.20GHz
  IPC-BX950T1-DC55F (DDR2 SDRAM 1GB, Windows XP Embedded, CF 2GB)
- OS-installed base model with Core Duo Processor 1.20GHz
  IPC-BX950T1-DC65F (DDR2 SDRAM 2GB, Windows XP Embedded, CF 2GB)
- OS-installed base model with Core Duo Processor 1.20GHz
  IPC-BX950T1-DC56F (DDR2 SDRAM 1GB, Windows XP Embedded, CF 4GB)
- Base model with Celeron M Processor
  IPC-BX950T2-DC400 (DDR2 SDRAM 512MB, without OS, CF)
- OS-installed base model with Celeron M Processor
  IPC-BX950T2-DC45F (DDR2 SDRAM 512MB, Windows XP Embedded, CF 2GB)
- Base model with Core Duo Processor 1.66GHz
  IPC-BX950T3-DC500 (DDR2 SDRAM 1GB, without OS, CF)
- OS-installed base model with Core Duo Processor 1.66GHz
  IPC-BX950T3-DC55F (DDR2 SDRAM 1GB, Windows XP Embedded, CF 2GB)

Features

- The 25mm thick of slim chassis [256(W) x 183(D) x 25(H)] that can be installed to a 35mm-wide space

A high performance embedded computer packaged in 25mm slim chassis [256(W) x 183(D) x 25(H)] that can be installed anywhere you want. It can be installed to a 35mm-wide space between walls, inside of the wall, or on the back of LCD display using the provided attachment fittings. (It is also possible to attach to the VESA standard 75 x 75, 100 x 100, 200 x 100, 200 x 200, 400 x 200mm using the optional fittings.)

- Adoption of 945GME Chipset to allow the mounting of Intel Core Duo / Celeron M processor

Adopting the Intel (R) 945GME, ICH7M-DH chip set, IPC-BX950T1 series achieve a high-level computing and drawing ability by using the 1.20GHz (FSB 533MHz) ultra low voltage Intel (R) Core (TM) Duo processor. This product is ideal for the content delivery through the large display. It also has 1GB or 2GB memory.

Adopting the Intel (R) 945GME, ICH7M-DH chip set, IPC-BX950T2 series have the 1.06GHz (FSB 533MHz) ultra low voltage Celeron (R) M processor. This product is ideal for the content delivery through the large display. It also has 512MB memory.

Adopting the Intel (R) 945GME, ICH7M-DH chip set, IPC-BX950T3 series achieve a high-level computing and drawing ability by using the 1.66GHz (FSB 667MHz) ultra low voltage Intel (R) Core (TM) Duo processor. This product is ideal for the content delivery through the large display. It also has 1GB memory.

- The extended interface such as Dual LAN, USB2.0, or Serial

It has a variety of extended interface such as 1000BASE-T x 2, USB2.0 x 4, serial (RS-232C) x 2.
It has two CF card slots that can use for OS and data. They are very useful because you can use one slot for system start-up and the other for maintenance, system log, or taking away the collected data. It also has a LVDS interface as well as a general-purpose analog RGB to display in double screens.

- Safety design required for embedded applications

Unnecessary trouble can be avoided by the use of clamps for prevention of cable disconnection and the use of metal fittings for prevention of CF card disconnection. Retention of CMOS data by EEPROM allows the system to start up even when the battery has run out. For Windows XP Embedded installed model, it is possible to use the EWF*1 function of OS. It is designed for safety required for embedding purpose, for example, prohibiting unwanted writing to the CF card with EWF function will relieve the concern about the writing limits to the CF card and prevent an unintentional system alteration.

*1 EWF (Enhanced Write Filter) is a function specific to Windows XP Embedded that protects the disk from being actually written by redirecting the writing to RAM.

- The adoption of a fan-less, CF card configuration providing high levels of reliability and quietness

It achieves the air-cooling system (fan-less) by using a large heat sink. It also achieves a high-level reliability and quietness by adopting CF card (bootable) as its storage device.

- A wide range of power supplies (12 - 24VDC) supported

As the product supports a wide range of power (12 - 24VDC), it can be used in a variety of power environments.

Supported OS

- Windows XP Embedded

Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

Web Site

Japanese http://www.contec.co.jp/
English http://www.contec.com/
Chinese http://www.contec.com.cn/

Latest product information

CONTEC provides up-to-date information on products.
CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information

Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

Limited One-Year Warranty

CONTEC products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original products. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Safety Precautions

Understand the following definitions and precautions to use the product safely.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Caution on the IPC-BX950 Series

Handling Precautions

⚠ WARNING

- Always check that the power supply is turned off before connecting or disconnecting power cables.
- Do not modify the product.
- Always turn off the power before inserting or removing circuit boards or cables.
- This product is not intended for use in aerospace, space, nuclear power, medical equipment, or other applications that require a very high level of reliability. Do not use the product in such applications.
- If using this product in applications where safety is critical such as in railways, automotive, or disaster prevention or security systems, please contact your retailer.
- Do not attempt to replace the battery as inappropriate battery replacement poses a risk of explosion.
- For battery replacement, contact your retailer as it must be performed as a process of repair.
- When disposing of a used battery, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

⚠ CAUTION

- Do not use or store this product in a location exposed to high or low temperature that exceeds range of specification or susceptible to rapid temperature changes.
  Example: - Exposure to direct sun
  - In the vicinity of a heat source
- Do not use this product in extremely humid or dusty locations. It is extremely dangerous to use this product with its interior penetrated by water or any other fluid or conductive dust. If this product must be used in such an environment, install it on a dust-proof control panel, for example.
- Avoid using or storing this product in locations subject to shock or vibration that exceeds range of specification.
- Do not use this product in the vicinity of devices that generate strong magnetic force or noise. Such products will cause this product to malfunction.
- Do not use or store this product in the presence of chemicals.
- To clean the BOX-PC, wipe it gently with a soft cloth dampened with either water or mild detergent. Do not use chemicals or a volatile solvent, such as benzene or thinner, to prevent pealing or discoloration of the paint.
- This product's case may become hot. To avoid being burned, do not touch that section while this product is in operation or immediately after turning off the power. Avoid installation in a location where people may come into contact with that section.
- CONTEC does not provide any guarantee for the integrity of data on CF.
- Always disconnect the power cable from the receptacle before mounting or removing the expansion board, or before connecting or disconnecting any connector.
- To prevent corruption of files, always shutdown the OS before turning off this product.
- CONTEC reserves the right to refuse to service a product modified by the user.
- In the event of failure or abnormality (foul smells or excessive heat generation), unplug the power cord immediately and contact your retailer.
- To connect with peripherals, use a grounded, shielded cable.
- Component Life:
  (1) Battery---The internal calendar clock and CMOS RAM are backed by a Lithium primary battery. The backup time at a temperature of 25°C with the power disconnected is 10 years or more.
  (2) CF ---The OS-installed model uses a CF card in the OS storage area. Estimated failure rates: 100,000 rewrite cycles, 500,000 hours MTBF. For more details, refer to Section 6 "Life of CF".

  * Replacement of expendables is handled as a repair (there will be a charge).

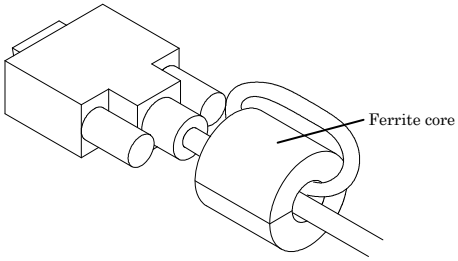
  * Component life is not guaranteed value but only referential value.

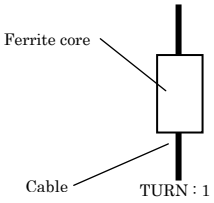
- Regarding “VCCI Class A Notice”, “FCC PART 15 Class A Notice” and “EMC Instruction Class A Notice”

  The ferrite core must be installed in the following each cable so that this product may suit the above-mentioned standard. Refer to the following for the model of ferrite core. (Equivalent goods are also availabele.)

Port	Name	Maker	Turn
LVDS	FRC2009A-6 or E04SR200935A	CONTEC or SEIWA	1

  - Image diagram





FCC PART 15 Class A Notice

(Only IPC-BX950T1-DC500, IPC-BX950T1-DC55F, IPC-BX950T1-DC65F, IPC-BX950T1-DC56F, IPC-BX950T2-DC400 and IPC-BX950T2-DC45F)

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

WARNING TO USER

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.

2. System Reference

Specification

Table 2.1. Functional Specification ***< 1 / 2 >***

Model			IPC-BX950T1-DCxxx	IPC-BX950T2-DCxxx	IPC-BX950T3-DCxxx
CPU			Ultra Low Voltage Intel(R) Core(TM) Duo Processor 1.20GHz (FSB533MHz)	Ultra Low Voltage Intel(R) Celeron(R) M Processor 1.06GHz(FSB533MHz)	Ultra Low Voltage Intel(R) Core(TM) Duo Processor 1.66GHz (FSB667MHz)
Chip set			Intel(R) 945GME + ICH7M-DH		
BIOS			BIOS (mfd. by Award)		
Memory			IPC-BX950Tx-DC4xx: 512MB IPC-BX950Tx-DC5xx: 1GB IPC-BX950Tx-DC6xx: 2GB 200pin SO-DIMM socket x 1, PC2-4300 (DDR2 533) DDR2 SDRAM support		
Video	Controller		Built in Intel 945GME		
	Video RAM		Main memory shared		
	Video BIOS		64KB(C0000H-CFFFFH)		
	Display I/F		Analog RGB I/F x 1 (15pin HD-SUB connector x 1) LVDS I/F x 1(26pin half pitch connector x 1)		
System resolution		Analog RGB	640 x 480, 800 x 600, 1,024 x 768, 1,152 x 864, 1,280 x 600, 1,280 x 720, 1,280 x 768, 1,280 x 960, 1,280 x 1,024, 1,400 x 1,050, 1,600 x 900, 1,600 x 1,200, 1,856 x 1,392, 1,920 x 1,080, 1,920 x 1,200, 1,920 x 1,440, 2,048 x 1,536 (16,770,000 colors)		
		LVDS	640 x 480, 800 x 600, 1,024 x 768 (260,000 colors)		
Audio			AC97 compliant LINE OUT: ϕ3.5 Stereo mini jack Full-scale output level 1.5Vrms (Typ.), Dual 50mW Amplifier		
CF card slot			CF CARD Type I x 2 bootable		
			IPC-BX950Tx-DCx0x : -, IPC-BX950Tx-DCx5x : CF1 is finished mounting CF (2GB, one partition) *1 IPC-BX950Tx-DCx6x : CF1 is finished mounting CF (4GB, one partition) *1		
Serial I/F			RS-232C (general-purpose) : 2ch (SERIAL PORT1, 2) 9pin D-SUB connector (male) Baud rate : 50 - 115,200bps For touch panel communication : 1ch (SERIAL PORT3) in LVDS connector		

*1: The capacity of CF is a value when 1GB is calculated by one billion bytes. The capacity that can be recognized from OS might be displayed fewer than an actual value.

Table 2.1. Functional Specification ***< 2 / 2 >***

Model		IPC-BX950T1-DCxxx	IPC-BX950T2-DCxxx	IPC-BX950T3-DCxxx
LAN	I/F	1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector x 2 (Wake On LAN support)		
	Controller	Intel 82573L Controller		
USB I/F		4ch (USB 2.0-compliant)		
Keyboard/mouse I/F		None *2		
General-purpose I/O		None		
Hardware monitoring		Monitoring CPU temperature, board temperature, power voltage		
Watch dog timer		Software programmable, 255 level (1sec - 255 sec) Causes a reset upon time-out.		
RTC/CMOS		Lithium backup battery life : 10 years or more The real-time clock is accurate within ±3 minutes (at 25°C) per month (ICH7 integrated RTC).		
Power Management		Power management setup via BIOS Modem Ring On/Wake One LAN Supports PC98/PC99 ACPI Power management		
Power supply	Input supply voltage	12 - 24VDC±5% *3		
	Current consumption	12V 3.4A (Max.), 24V 1.9A (Max.)		12V 4.2A (Max.), 24V 2.2A (Max.)
	External device power supply capacity	- CF card slot +3.3V : 1A (500mA x 2) - USB I/F +5V : 2A (500mA x 4)		
Physical dimensions (mm)		256(W) x 183(D) x 25(H) (No protrusions)		
Weight		About 1.3kg		

*2: Use USB I/F for the keyboard/mouse.

*3: Use a power cable shorter than 3m.

Table 2.2. Installation Environment Requirements

Model			IPC-BX950T1-DCxxx	IPC-BX950T2-DCxxx	IPC-BX950T3-DCxxx
Ambient specifications	Operating temperature *4		(1) Vertical installation (power connector is downside) : 0 - 50°C (2) Vertical and horizontal installation other than above : 0 - 45°C		(1) 0 - 45°C (2) 0 - 40°C
	Storage temperature		-10 - 60°C		
	Humidity		10 - 90%RH (No condensation)		
	Floating dust particles		Not to be excessive		
	Corrosive gases		None		
	Line-noise resistance	Line noise	AC line/±2kV *5, Signal line/±1kV (IEC61000-4-4 Level 3, EN61000-4-4 Level 3)		
		Static electricity resistance	Contact discharge /±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2) Atmospheric discharge /±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)		
	Vibration resistance	Sweep resistance	10 - 57Hz/semi-amplitude 0.15mm 57 - 150Hz/2.0G 40 min. each in x, y, and z directions (JIS C60068-2-6 compliant, IEC60068-2-6 compliant)		
	Impact resistance		10G, half-sine shock for 11 ms in x, y, and z directions (JIS C60068-2-27-compliant, IEC60068-2-27-compliant)		
	Grounding		Class D grounding (previous class 3 grounding), SG-FG/continuity		

*4 : For more details on this, please refer to chapter 3, “Installation Requirements”.

*5 : When AC/DC power unit “LDA100W-24-SN, LDA100W-12-SN” (by Cosel) is used.

Power Management Features

- Support both ACPI (Advanced Configuration and Power Interface) and legacy (APM) power management.
- ACPI v2.0 compliant
- APM v1.2 compliant
- Support hardware automatic wake-up

Power Requirements

Your system requires a clean, steady power source for reliable performance of the high frequency CPU on the product, the quality of the power supply is even more important. For the best performance makes sure your power supply provides a range of 11.4 V minimum to 25.2 V maximum DC power source.

Power Consumption

For typical configurations, the CPU card is designed to operate with at least a 100W power supply. The power supply must meet the following requirements :

- Rise time for power supply: 2 ms - 30 ms
- Minimum delay for reset to Power Good: 100ms
- Minimum Power down warning: 1 ms

The following table lists the power supply's tolerances for DC voltages:

Table 2.3. DC voltage tolerance

DC Voltage	Acceptable Tolerance
+ 12V - 24V	±5%

Physical Dimensions

IPC-BX950Tx-DCxxx

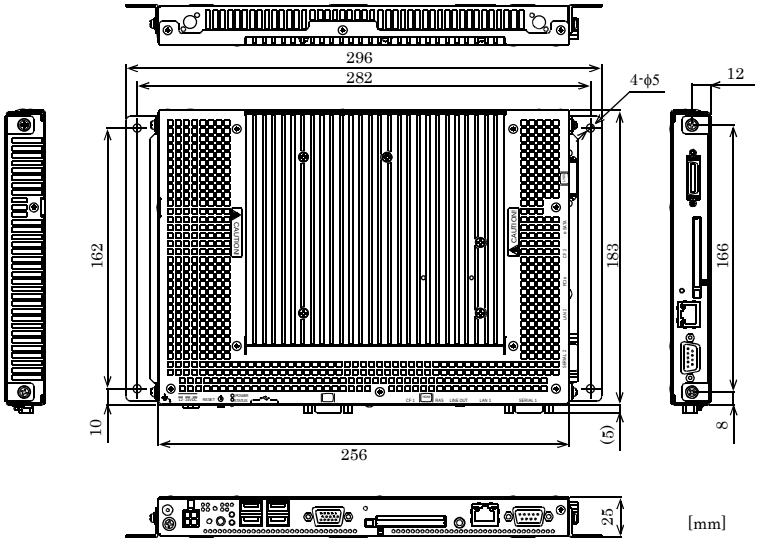


Figure 2.1. IPC-BX950Tx-DCxxx

3. Hardware Setup

Before Using the BOX-PC for the First Time

Follow the next steps to set up the BOX-PC:

STEP1 By referring to the information in this chapter, install, connect and set the BOX-PC.

STEP2 Connect cables.
Connect the cable of necessary external devices, such as keyboard and a display, to this product using appropriate cables.

STEP3 Turn on the power.
After verifying that you have correctly followed steps 1 and 2, turn on the power.
If you find any abnormality after turning on the power, turn it off and check to see if the setup has been performed properly.

STEP4 Set up BIOS.
By referring to Chapter 4, set up BIOS. This setup requires a keyboard and a display.

* Before using the BOX-PC, be sure to execute "LOAD SETUP DEFAULTS" to initialize the BIOS settings to their default values.
(See Chapter 4, "Main Menu.")

⚠ CAUTION

Be sure to connect the keyboard and mouse to it before turning the power on for the first time.

Hardware Setup

- Before you start, be sure that the power is turned off.
- Remove only those screws that are explained. Do not move any other screw.

Attaching the CF Attachment Fittings

(1) After inserting a CF Card, fasten the bundled CF attachment fittings with a screw.

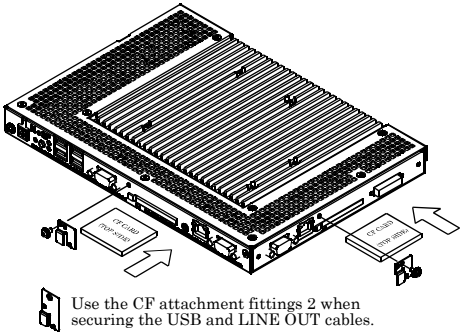


Figure 3.1. Attaching the CF Attachment Fittings

⚠ CAUTION

Insert the CF Card face up.

Attaching the Attachment Fittings

(1) Use screws to attach the bundled attachment fittings with a screw.
Do not tighten screws with excess force. The tightening torque should be 4kg/cm or less.

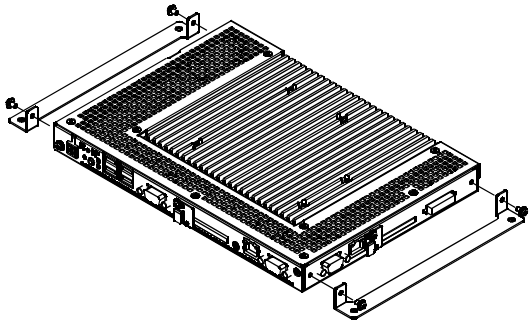


Figure 3.2. Attaching the Attachment Fittings

⚠ CAUTION

Screw holes may be damaged if screws are tightened with a torque greater than the specified torque.

Attaching the FG

(1) Use screws to attach the FG

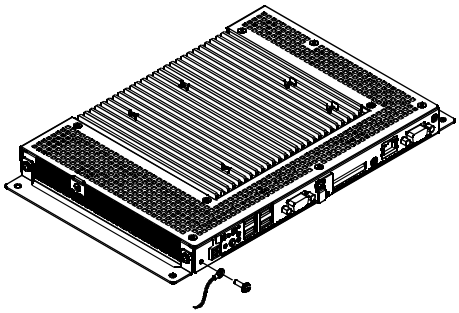


Figure 3.3. Attaching the FG

⚠ CAUTION

The FG pin of this product is connected to the GND signal of the DC power connector (DC-IN). Note that the connection cannot be cut off.

Fastening the Cable

This product comes with clamps for fixing cables.

Fastening the LINEOUT, USB Cable

(1) The system unit has a hole for attaching cable clamp to CF attachment fittings 2. Using a cable clamp for a cable with lock-less connector, such as the LINEOUT and USB Cable, prevents the connector from being unplugged. Use the cable ties and cable clamps appropriately according to the connecting states and wiring directions of cables.

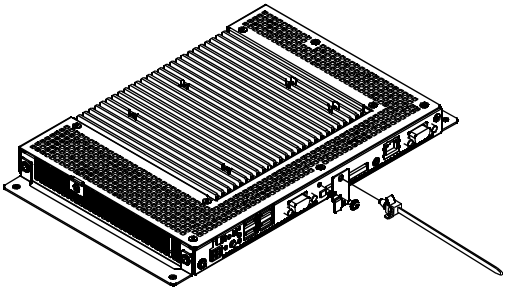


Figure 3.4. Attaching the cable clamp

(2) The photo below shows an example of using a cable clamp. Fix the cable with a clamp without applying stress to the connector.

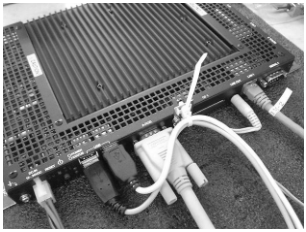


Figure 3.5. Using example of cable clamp

Installation Requirements

Be sure that the ambient temperature is within the range specified in the installation environment requirement by making space between the product and device that generates heat or exhaust air.

IPC-BX950T1-DCxxx, IPC-BX950T2-DCxxx

Installable directions at ambient temperature 0°C - +50°C
: (2) Vertical installation (power connector is downside)

Installable directions at ambient temperature 0°C - +45°C
: All type of installation other than above (including diagonal installation)

IPC-BX950T3-DCxxx

Installable directions at ambient temperature 0°C - +45°C
: (2) Vertical installation (power connector is downside)

Installable directions at ambient temperature 0°C - +40°C
: All type of installation other than above (including diagonal installation)

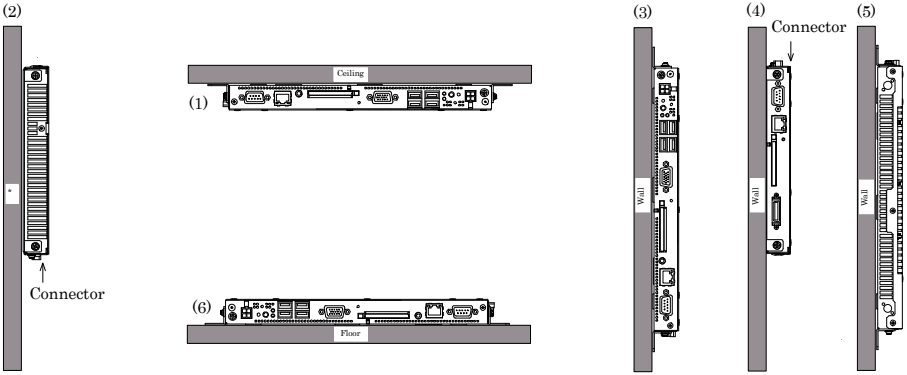


Figure 3.6. Installation Orientation

⚠ CAUTION

Note that even though the ambient temperature is within the specified range, an operational malfunction may occur if there is other device generating high heat; the radiation will influence the product to increase its temperature.

Distances between the BOX-PC and Its Vicinity

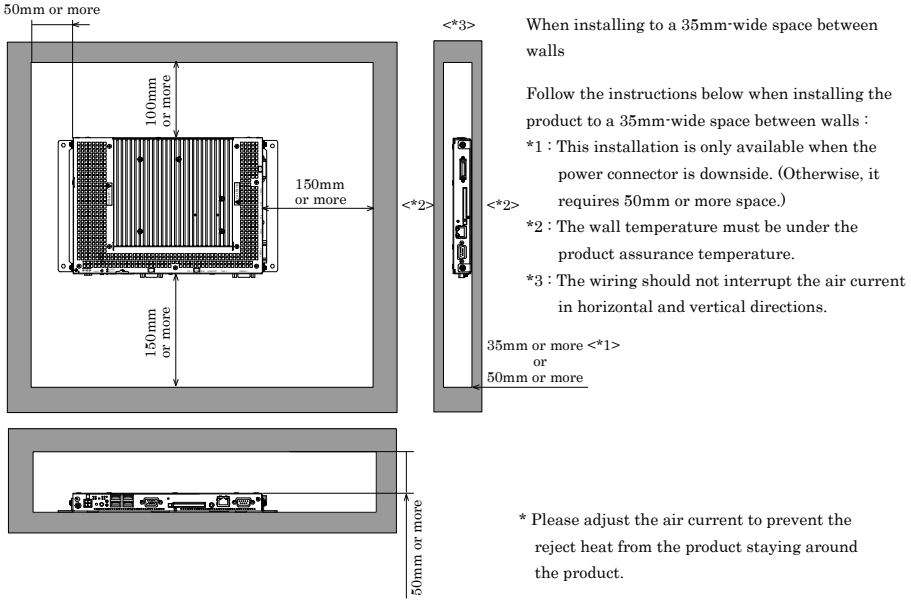

50mm or more
100mm or more
150mm or more
150mm or more
<*2>
<*2>
<*3>
When installing to a 35mm-wide space between walls
Follow the instructions below when installing the product to a 35mm-wide space between walls :
*1 : This installation is only available when the power connector is downside. (Otherwise, it requires 50mm or more space.)
*2 : The wall temperature must be under the product assurance temperature.
*3 : The wiring should not interrupt the air current in horizontal and vertical directions.
35mm or more <*1>
or
50mm or more
50mm or more
* Please adjust the air current to prevent the reject heat from the product staying around the product.

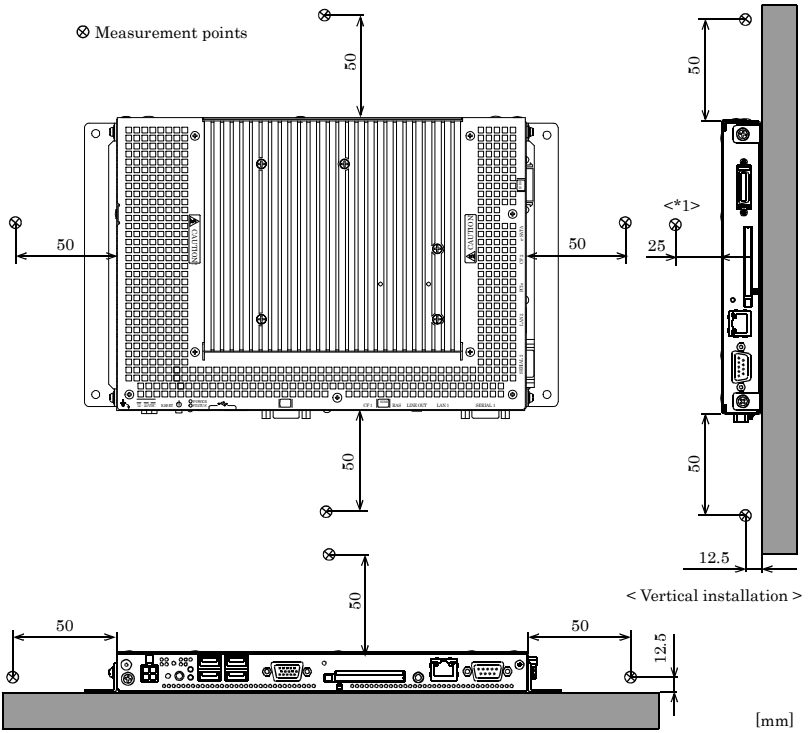
Figure 3.7. Distances between the BOX-PC and Its Vicinity

⚠ CAUTION

Do not install this product into the fully-sealed space except the case in which the internal temperature is adjustable by equipment such as air conditioner. Troubles such as operational malfunctions could be occurred by the temperature increase caused by long-term usage.

Ambient temperature

In this product, the ambient temperature is decided from the multiple measurement points as shown below. When making use of the product, the air current should be adjusted to prevent that all the temperatures measured at the measurement points exceed the specified temperature.



* When installing to a 35mm-wide space between walls, measure temperature of the wall facing the heat sink, and use the temperature as the ambient temperature.

4. BIOS Setup

Introduction

This chapter discusses Award's Setup program built into the FLASH ROM BIOS. The Setup program allows users to modify the basic system configuration. This special information is then stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

The rest of this chapter is intended to guide you through the process of configuring your system using Setup.

Starting Setup

The Award BIOS is immediately activated when you first power on the computer. The BIOS reads the system information contained in the CMOS and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1 By pressing <Del> immediately after switching the system on, or

2 By pressing the <Del> key when the following message appears briefly at the bottom of the screen during the POST (Power On Self-Test).

Press DEL to enter SETUP.

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to.

Press F1 to continue, DEL to enter SETUP

Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Table 4.1. Using Setup

Key	Function
Up Arrow	Move to the previous item
Down Arrow	Move to the next item
Left Arrow	Move to the item on the left (menu bar)
Right Arrow	Move to the item on the right (menu bar)
Esc	Main Menu: Quit without saving changes Submenus: Exit Current page to the next higher level menu
Move Enter	Move to the item you desired
PgUp key	Increase the numeric value or make changes
PgDn key	Decrease the numeric value or make changes
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
Esc key	Main Menu -- Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1 key	General help on Setup navigation keys
F5 key	Load previous values from CMOS
F6 key	Load the fail-safe defaults from BIOS default table
F7 key	Load the optimized defaults
F10 key	Save all the CMOS changes and exit

Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the F1 key again.

In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the AwardBIOS™ supports an override to the CMOS settings which resets your system to its defaults.

The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

A Final Note About Setup

The information in this chapter is subject to change without notice.

Main Menu

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

Note that a brief description of each highlighted selection appears at the bottom of the screen.

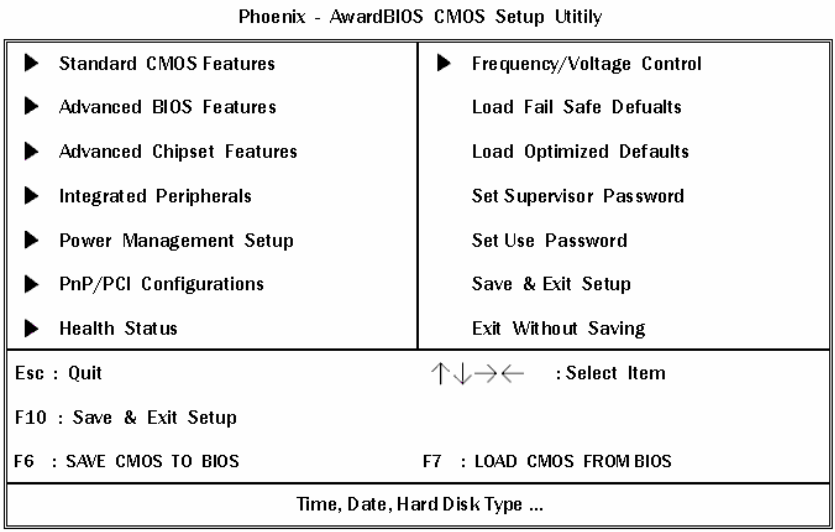


Figure 4.1. Main Manu

Setup Items

The main menu includes the following main setup categories. Recall that some systems may not include all entries.

Standard CMOS Features

Use this menu for basic system configuration.

Advanced BIOS Features

Use this menu to set the Advanced Features available on your system.

Advanced Chipset Features

Use this menu to change the values in the chipset registers and optimize your system's performance.

Integrated Peripherals

Use this menu to specify your settings for integrated peripherals.

Power Management Setup

Use this menu to specify your settings for power management.

PnP / PCI Configuration

This entry appears if your system supports PnP / PCI.

Load Fail-Safe Defaults

Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate.

Load Optimized Defaults

Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While Award has designed the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs.

Supervisor / User Password

Use this menu to set User and Supervisor Passwords.

Save & Exit Setup

Save CMOS value changes to CMOS and exit setup.

Exit Without Save

Abandon all CMOS value changes and exit setup.

Standard CMOS Setup

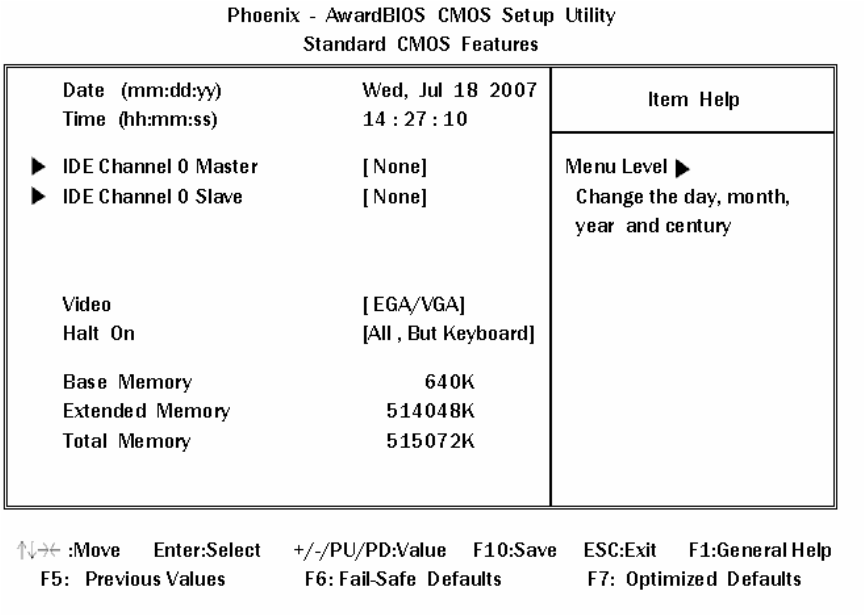

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Date (mm:dd:yy) Wed, Jul 18 2007
Time (hh:mm:ss) 14 : 27 : 10
IDE Channel 0 Master [None]
IDE Channel 0 Slave [None]
Video [EGA/VGA]
Halt On [All , But Keyboard]
Base Memory 640K
Extended Memory 514048K
Total Memory 515072K
Item Help
Menu Level ▶
Change the day, month, year and century
:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.2. Standard CMOS Setup

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

Main Menu Selections

This table shows the selections that you can make on the Main Menu

Table 4.2. Main Menu Selections

Item	Options	Description
Date	Month DD YYYY	Set the system date. Note that the 'Day' automatically changes when you set the date
Time	HH : MM : SS	Set the system time
IDE Channel 0 Master	Options are in its sub menu	Press <Enter> to enter the sub menu of detailed options
IDE Channel 0 Slave	Options are in its sub menu	Press <Enter> to enter the sub menu of detailed options
Video	EGA/VGA CGA 40 CGA 80 MONO	Select the default video device. Usually select EGA/VGA.
Halt On	All Errors No Errors All, but Keyboard	Select the situation in which you want the BIOS to stop the POST process and notify you
Base Memory	N/A	Displays the amount of conventional memory detected during boot up
Extended Memory	N/A	Displays the amount of extended memory detected during boot up
Total Memory	N/A	Displays the total memory available in the system

IDE Adapters

The IDE adapters control the CF card. Use a separate sub menu to configure each CF card.

Use the legend keys to navigate through this menu and exit to the main menu. Use Table 4.3 to configure the hard disk.

Table 4.3. IDE Adapters configurations

Item	Options	Description
IDE HDD Auto-detection	Press Enter	Press Enter to auto-detect the CF card on this channel. If detection is successful, it fills the remaining fields on this menu.
IDE Channel 0/2 Master/Slave	None Auto Manual	Selecting 'manual' lets you set the re-maining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=65535 means NONE !
Capacity	Auto Display your CF card size	Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk checking program.
Access Mode	CHS LBA Large Auto	Choose the access mode for this CF card.
The following options are selectable only if the 'IDE Channel 0/2 Master/Slave' item is set to 'Manual'		
Cylinder	Min = 0 Max = 65535	Set the number of cylinders for this CF card.
Head	Min = 0 Max = 255	Set the number of read/write heads
Precomp	Min = 0 Max = 65535	**** **Warning** : Setting a value of 65535 means no CF card
Landing zone	Min = 0 Max = 65535	****
Sector	Min = 0 Max = 255	Number of sectors per track

Advanced BIOS Features Setup

This section allows you to configure your system for basic operation. You have the opportunity to select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.

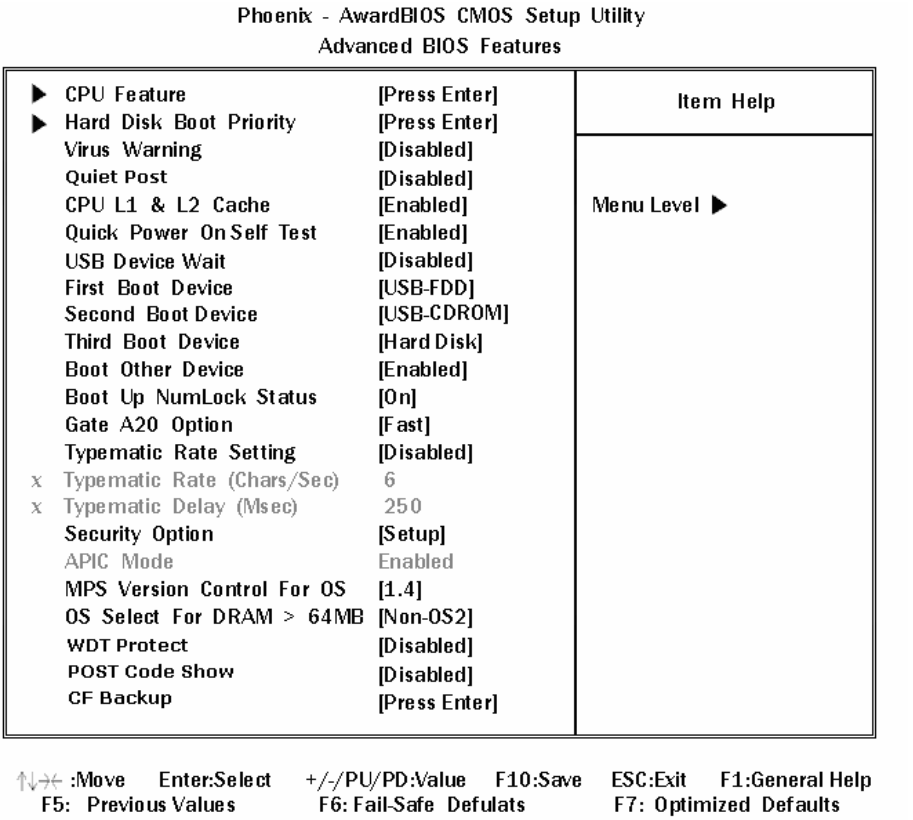

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Hard Disk Boot Priority [Press Enter]
Virus Warning [Disabled]
Quiet Post [Disabled]
CPU L1 & L2 Cache [Enabled]
Quick Power On Self Test [Enabled]
USB Device Wait [Disabled]
First Boot Device [USB-FDD]
Second Boot Device [USB-CDROM]
Third Boot Device [Hard Disk]
Boot Other Device [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Typematic Rate Setting [Disabled]
x Typematic Rate (Chars/Sec) 6
x Typematic Delay (Msec) 250
Security Option [Setup]
APIC Mode Enabled
MPS Version Control For OS [1.4]
OS Select For DRAM > 64MB [Non-OS2]
WDT Protect [Disabled]
POST Code Show [Disabled]
CF Backup [Press Enter]
Item Help
Menu Level ▶
↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defulats F7: Optimized Defaults

Figure 4.3. Advanced BIOS Features Setup

CPU Feature

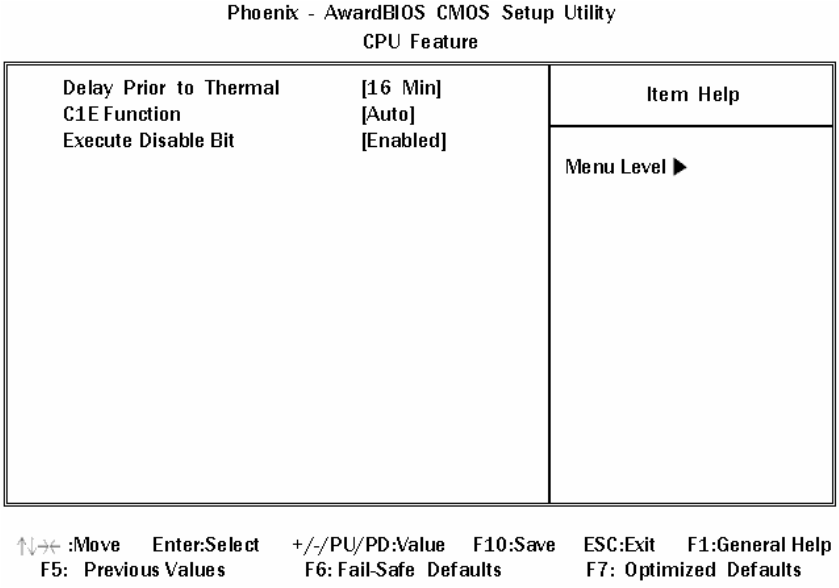
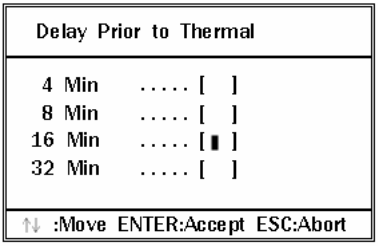
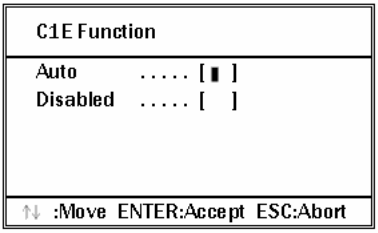
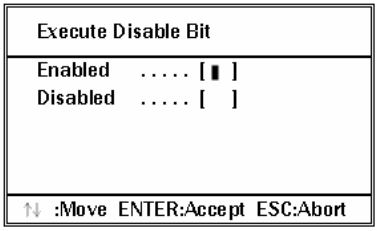

Phoenix - AwardBIOS CMOS Setup Utility
CPU Feature
Delay Prior to Thermal [16 Min]
C1E Function [Auto]
Execute Disable Bit [Enabled]
Item Help
Menu Level ▶
↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.4. CPU Feature

Press <Enter> to configure the settings relevant to CPU Feature.

Table 4.4. CPU Features Selections

Description	Choice
Delay Prior to Thermal Select the interval to setup the delay timer for CPU Thermal-Throuttling	
C1E Function CPU C1E Function Select.	

Description	Choice
Execute Disable Bit When disabled, forces the XD feature flag to always return 0.	

Hard Disk Boot Priority

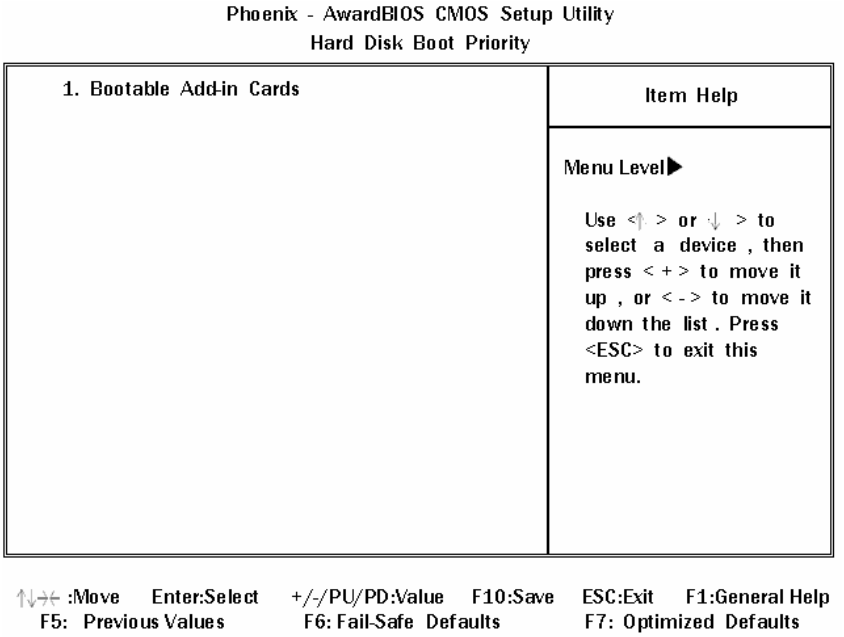

Phoenix - AwardBIOS CMOS Setup Utility
Hard Disk Boot Priority
1. Bootable Add-in Cards
Item Help
Menu Level▶
Use < > or < > to select a device , then press < + > to move it up , or < - > to move it down the list . Press <ESC> to exit this menu.
:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.5. Hard Disk Boot Priority

With the field, there is the option to choose, aside from the hard disks connected, “Bootable add-in Cards” which refers to other external device.

Virus Warning

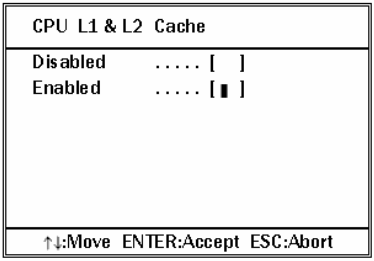
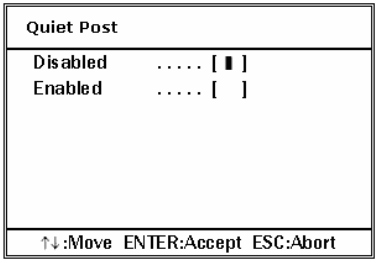
When enabled, you receive a warning message if a program (specifically, a virus) attempts to write to the boot sector or the partition table of the hard disk drive. You should then run an anti-virus program. Keep in mind that this feature protects only the boot sector, not the entire hard drive.

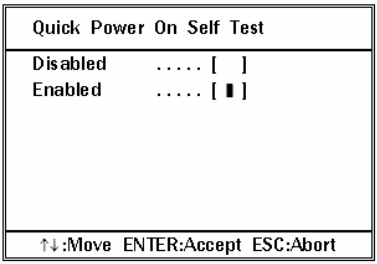
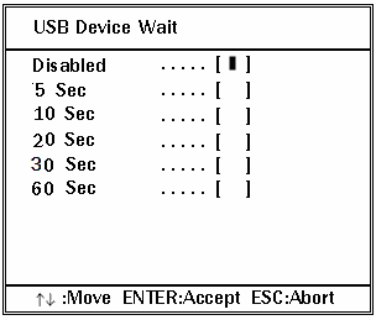
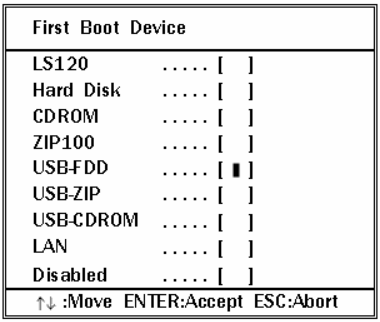
⚠ CAUTION

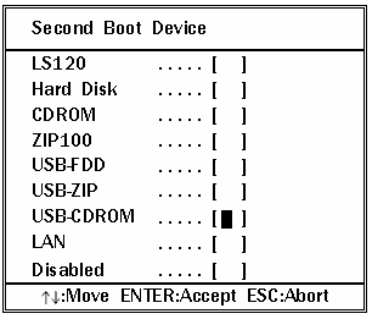
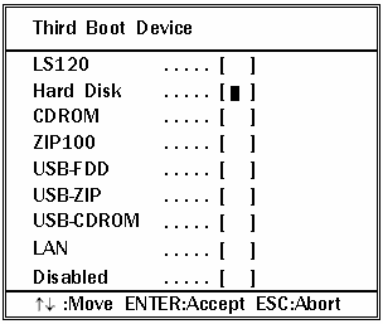
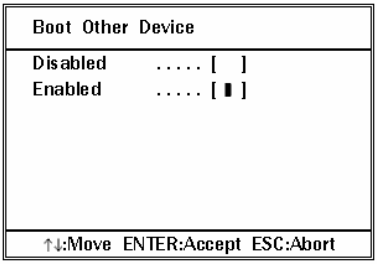
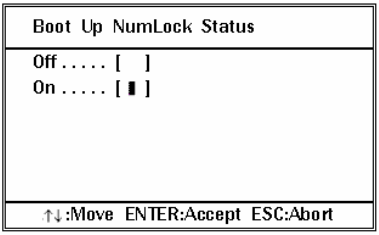
Many disk diagnostic programs that access the boot sector table can trigger the virus warning message. If you plan to run such a program, we recommend that you first disable the virus warning.

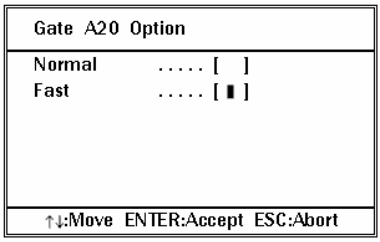
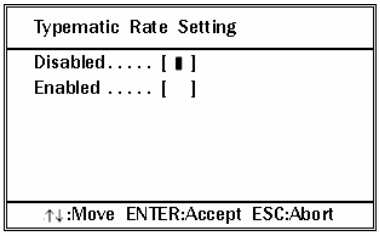
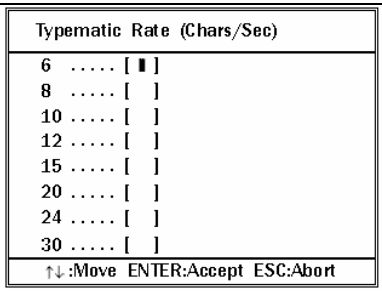
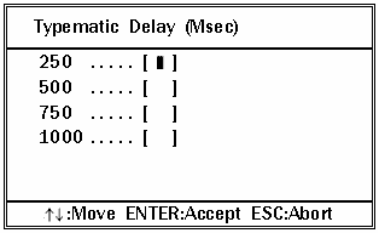
Enabled	Activates automatically when the system boots up causing a warning message to appear when any-thing attempts to access the boot sector or hard disk partition table.
Disabled	No warning message will appear when anything attempts to access the boot sector or hard disk partition table.

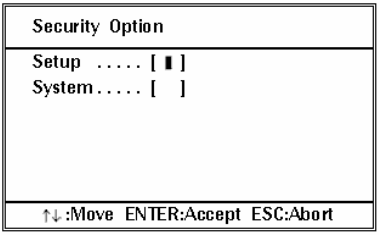
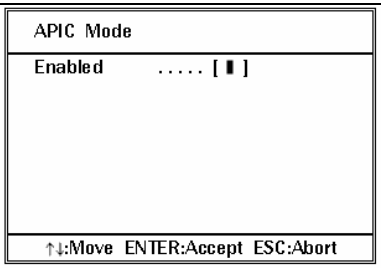
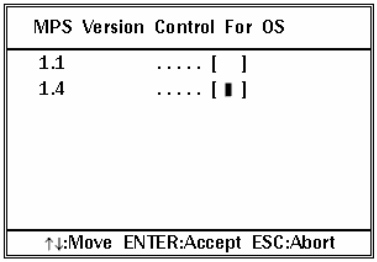
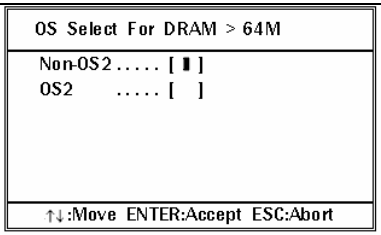
Table 4.5. Advance BIOS Feature Selections

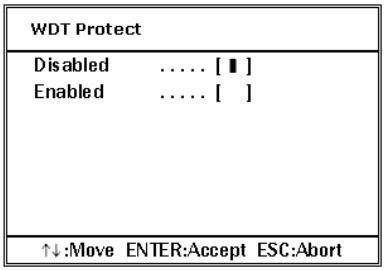
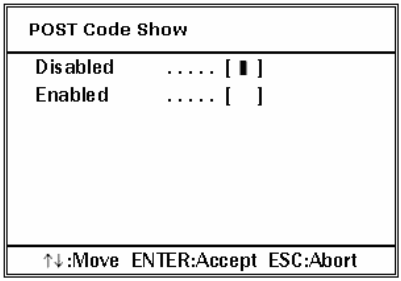
Description	Choice
CPU L1 & L2 Cache These allow you to enable (speed up memory access) or disable the cache function.	
Quiet Post Skip certain self-diagnosis processes such as checking memory or other several devices for shorter bootup time. Default setting (Disabled) does not simplify the self-diagnosis process.	

Description	Choice
Quick Power On Self Test Select Enabled to reduce the amount of time required to run the power-on self-test (POST). A quick POST skips certain steps. We recommend that you normally disable quick POST. Better to find a problem during POST than lose data during your work	
USB Device Wait When USB devices, which need longer time to be booted, are connected, the boot possibly can not be processed in normal condition. To address such cases, this setting specifies the waiting time for BIOS and delays the start of the access to the USB devices. Therefore, the boot will be delayed by the specified waiting time.	
First Boot Device The BIOS attempts to load the operating system from the devices in the sequence selected in these items.	

Description	Choice
Second Boot Device The BIOS attempts to load the operating system from the devices in the sequence selected in these items.	
Third Boot Device The BIOS attempts to load the operating system from the devices in the sequence selected in these items.	
Boot Other Device The BIOS attempts to load the operating system from the devices in the sequence selected in these items.	
Boot Up NumLock Status Toggle between On or Off to control the state of the NumLock key when the system boots. When toggled On, the numeric keypad generates numbers instead of controlling cursor operations.	

Description	Choice
Gate A20 option Gate A20 refers to the way the system addresses memory above 1 MB (extended memory). When set to Fast, the system chipset controls Gate A20. When set to Normal, a pin in the keyboard controller controls Gate A20. Setting Gate A20 to Fast improves system speed, particularly with OS/2 and Windows	
Typematic Rate Setting When Disabled, the following two items (Typematic Rate and Typematic Delay) are irrelevant. Keystrokes repeat at a rate determined by the keyboard controller in your system. When Enabled, you can select a typematic rate and typematic delay.	
Typematic Rate (Chars/Sec) When the typematic rate setting is enabled, you can select a typematic rate (the rate at which character repeats when you hold down a key) of 6, 8, 10, 12, 15, 20, 24 or 30 characters per second.	
Typematic Delay (Msec) When the speed setting for the key input is enabled, you can specify the interval of waiting time for the continuous key input.	

Description	Choice
Security Option Select whether the password is required every time the system boots or only when you enter setup. If you have set a password, select whether the password is required every time the System boots, or only when you enter Setup. System: The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt. Setup: The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.	
Note: To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.	
APIC Mode APIC stands for Advanced Programmable Interrupt Controller. Note : This item is show only	
MPS Version Control For OS Use the Multiprocessor Specification (MPS) for OS option to specify the MPS version to be used. MPS version 1.4 added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability.	
OS Select For DRAM > 64M Select the operating system that is running with greater than 64MB of RAM on the system.	

Description	Choice
WDT Protect WDT protect can be enabled to monitor the situations that halt BIOS bootup such as malfunction of the connected device(s), accidental noise, and some other unpredictable happenings. When Enabled, and if BIOS startup is halted during the startup, the system is reset and rebooting is attempted.	
Post Code Show During BIOS startup, the Post Code is displayed at the right upper corner of the screen. The Post Code is shown, however, after the initialization of graphic device is finished and the system is ready for screen display.	
CF Backup Selecting this option allows you to launch a tool for creating the backup of CF and restoring it. This can be used to backup your current environment as it is. For details, please refer to the explanation below (*1).	---

*1 About the CF Backup Feature

To use the CF Backup feature, a separately-available CF for backup is required. The CF for backup must be the CF of the same model or larger capacity. Using the CF that is not our optional parts can be the cause of unidentified problems and it must be ensured that the CF works with your system without problem before using this feature.

Also, before performing backup, read the licensing terms of your operating system carefully so that the backup is carried out within the scope of given license. Please check the OS license that is included in this product.

Followings are the steps to use the CF Backup feature.

<Using the CF Backup Feature>

(1) Connect display and keyboard to the box computer.
(2) Insert the CF and the CF for backup to the respective CF slot before turning the power on.(3) Press the “DEL” key before the startup to invoke the BIOS setting screen, and select “CF Backup” from menu.
(4) Follow the messages on the screen to proceed with the process. For the copy process, the Source Disk (the CF to be backed up) and the Destination Disk (the CF for backup) must be specified. The contents of the Source Disk can be lost if the Disks are wrongly assigned: ensure the correct operation by carefully reading the displayed message and performing the procedures accordingly.
(5) When the backup process is finished, the message “BACKUP finish, Press any key reboot.” is displayed. Enter any one of the alphabet keys from A to Z. The system reboots upon the key input.
(6) Backup completes when the above steps are done.

If backup is performed to a same type CF as the current CF, the contents of the backup CF becomes the same as the current CF. Therefore the backup CF can be used as it is in place of the current CF.

If backup is performed to a CF whose capacity is larger than the current CF, the backup CF cannot be used as it is. The backed-up contents can be used after being transferred to a CF of the same type as the current CF. For the transfer procedure, refer to “How to use CF Backup function” described above.

Advanced Chipset Features Setup

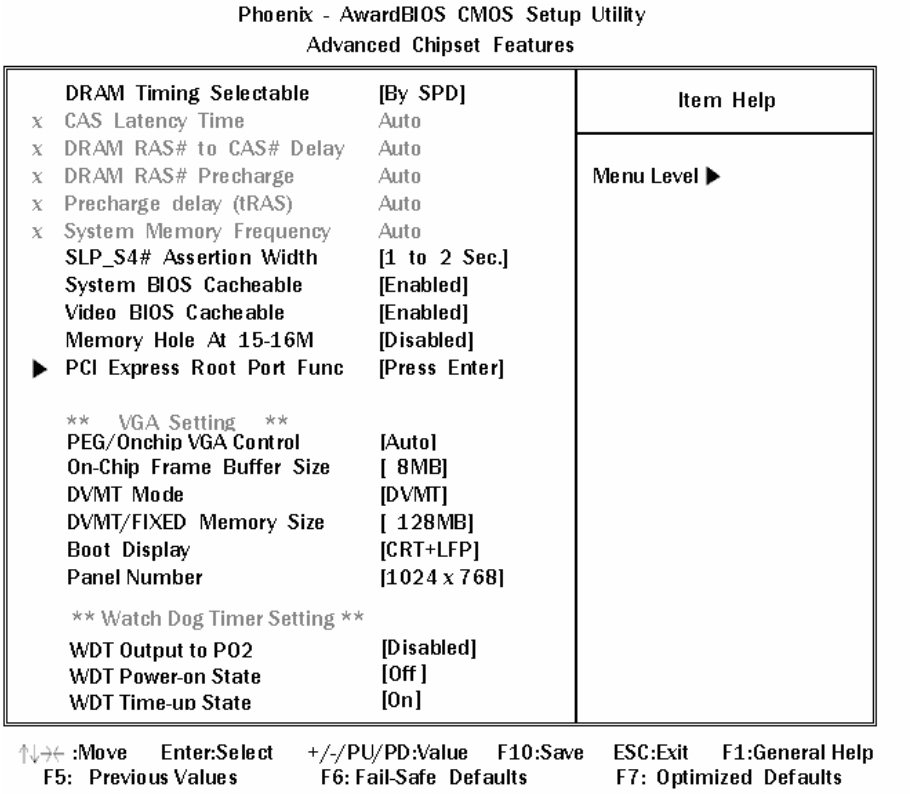
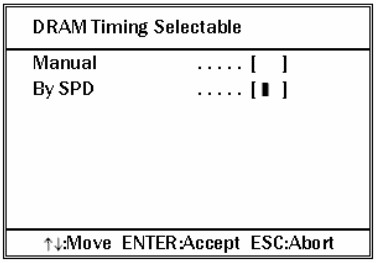
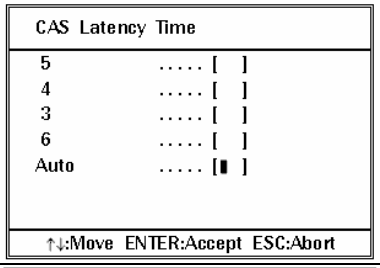
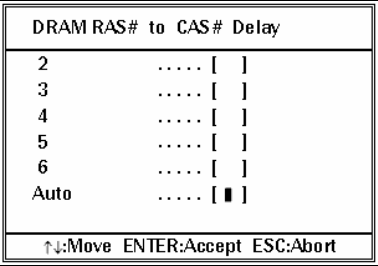
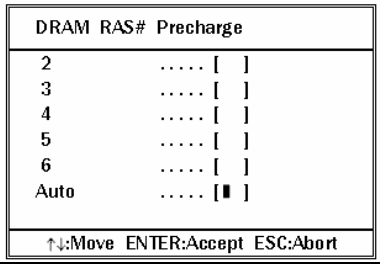
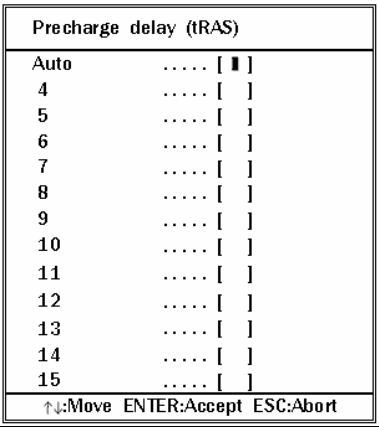
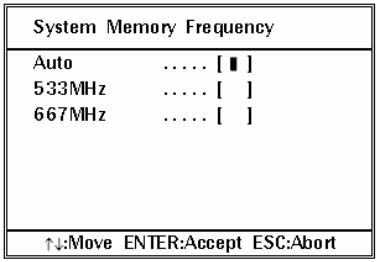
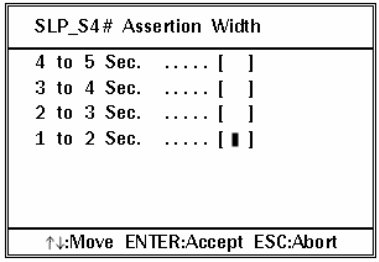
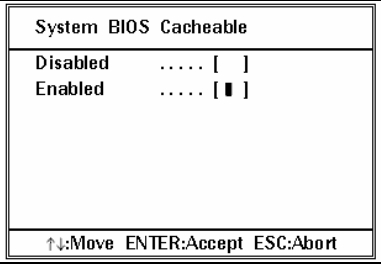

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features
DRAM Timing Selectable [By SPD]
x CAS Latency Time Auto
x DRAM RAS# to CAS# Delay Auto
x DRAM RAS# Precharge Auto
x Precharge delay (tRAS) Auto
x System Memory Frequency Auto
SLP_S4# Assertion Width [1 to 2 Sec.]
System BIOS Cacheable [Enabled]
Video BIOS Cacheable [Enabled]
Memory Hole At 15-16M [Disabled]
PCI Express Root Port Func [Press Enter]
** VGA Setting **
PEG/Onchip VGA Control [Auto]
On-Chip Frame Buffer Size [8MB]
DVMT Mode [DVMT]
DVMT/FIXED Memory Size [128MB]
Boot Display [CRT+LFP]
Panel Number [1024 x 768]
** Watch Dog Timer Setting **
WDT Output to P02 [Disabled]
WDT Power-on State [Off]
WDT Time-up State [On]
Item Help
Menu Level ▶
:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

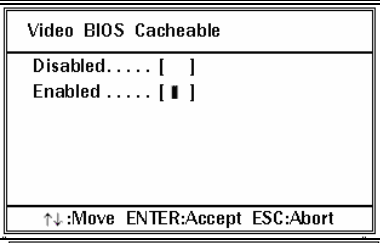
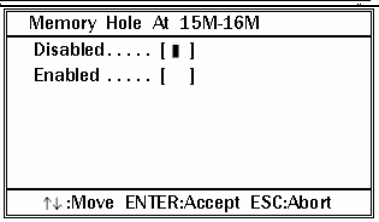
Figure 4.6. Advanced Chipset Features Setup

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

Table 4.6. Advance Chipset Feature Selections

Description	Choice
DRAM Timing Selectable The value in this field depends on performance parameters of the installed memory chips (DRAM). Do not change the value from the factory setting unlees you install new memory that has a different performance rating than the original DRAMs.	
CAS Latency Time When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing. Do not reset this fild from the default value specified by the system designer. You can select CAS latency time in HCLK of 3/4/5/6 or Auto. The system board designer should set the values in this field, depends on the DRAM installed specifications of the installed DRAM or the installed CPU.	
DRAM RAS# to CAS# delay This field lets you insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed. Fast gives faster performance; and Slow gives more stable performance. This field applies only when synchronous DRAM is installed in the system.	
DRAM RAS# Precharge The precharge time is the number of cycles it takes for the RAS to accumulate its charge before DRAM refresh. If insufficient time is allowed, refresh may be incomplete and the DRAM may fail to retain data.	

Description	Choice
Precharge delay (tRAS) This item controls the number of DRAM clocks to activate the precharge delay. The default setting for the DRAM Cycle time tRAS is Auto.	
System Memory Frequency This item sets the main memory frequency.	
SLP_S4# Assertion Width Allows you to set the SLP_S4# assertion width. The default setting is 1 to 2 Sec.	
System BIOS Cacheable Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.	

Description	Choice
Video BIOS Cacheable Selecting Enabled allows caching of the video BIOS ROM at C0000h to C7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.	
Memory Hole At 15M-16M In order to improve performance, certain space in memory can be reserved for ISA card. This memory must be mapped into the memory space below 16MB.	

PCI Express Root Port Function

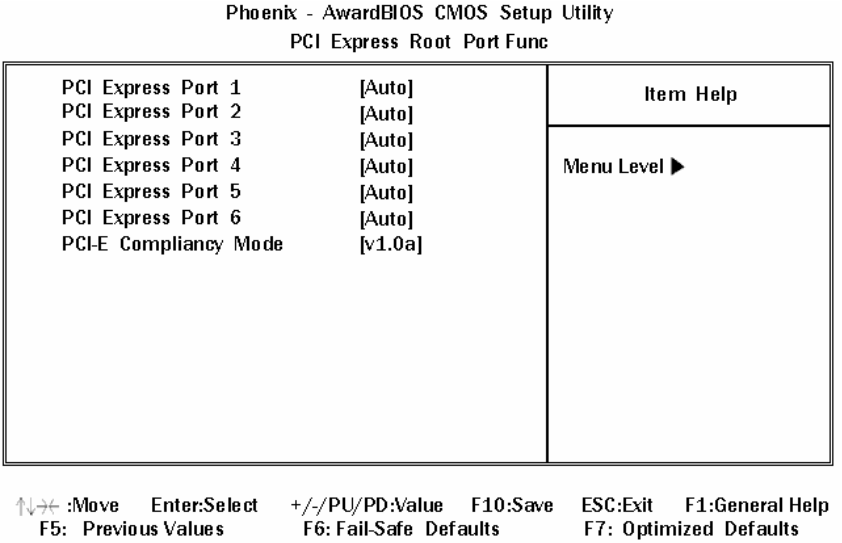
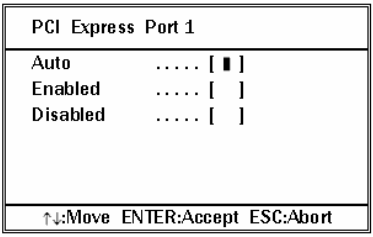
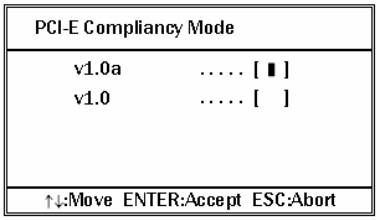

Phoenix - AwardBIOS CMOS Setup Utility
PCI Express Root Port Func
PCI Express Port 1 [Auto]
PCI Express Port 2 [Auto]
PCI Express Port 3 [Auto]
PCI Express Port 4 [Auto]
PCI Express Port 5 [Auto]
PCI Express Port 6 [Auto]
PCI-E Compliancy Mode [v1.0a]
Item Help
Menu Level ▶
↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.7. PCI Express Root Port Function

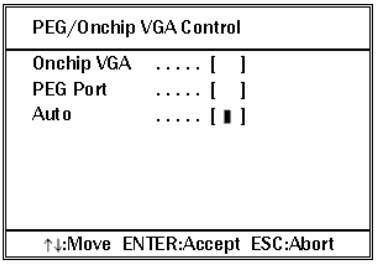
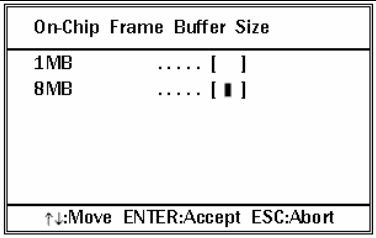
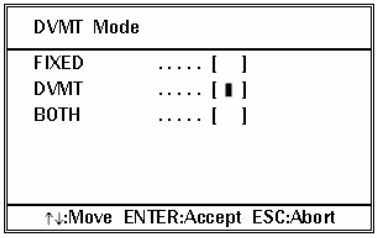
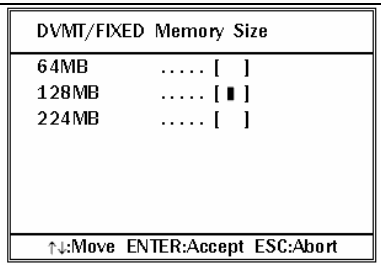
Table 4.7. PCI Express Root Port Function Selections

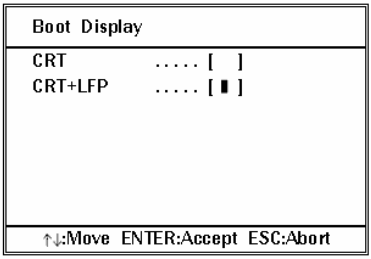
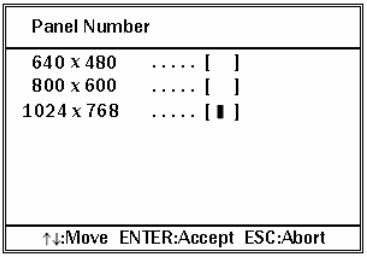
Description	Choice
PCI Express Port 1/2/3/4/5/6 This item allows you to enable or disable or Auto configure the PCI Express Port 1/2/3/4/5/6.	
PCI-E Compliancy Mode This item allows you to set PCI Express compliancy mode.	

VGA setting

The field under the On-Chip VGA Setting and their defaults settings are:

Table 4.8. VGA Setting Selections

Description	Choice
PEG/On Chip VGA Control Select VGA Control by PCI Express Graphic, On-chip or Auto. This setting is for the function of future expansion. Set to Auto usually.	
On-Chip Frame Buffer Size When Enabled, a fixed VGA frame buffer from A000h to BFFFh and a CPU-to-PCI write buffer are implemented.	
DVMT Mode Allows you to set the Dynamic Video Memory Technology (DVMT) mode.	
DVMT/FIXED Memory Size Allows you to set the Dynamic Video Memory Technology (DVMT) memory size.	

Description	Choice
Boot Display This item allows you to select the boot display device.	
Panel Number These fields allow you to select the LCD Panel type.	

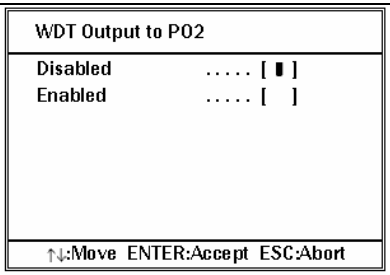
Watch Dog Timer Setting

Output settings for PO2 of the watchdog timer in RAS port.
I use it only in the model that carried an RAS port.

WDT Output to PO2

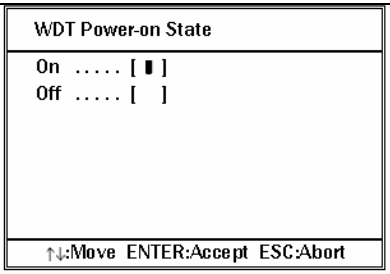
Set watchdog timer output to PO2.

Selecting "Enabled" connects the output of the watchdog timer to the PIO2 pin in the RAS connector. The output value changes depending on the "WDT Power-on State" and "WDT Time-up State" settings.



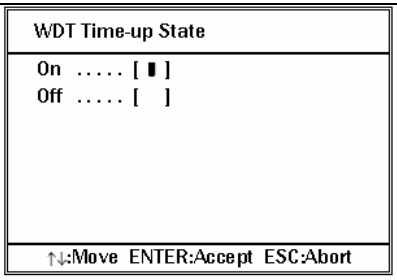
WDT Power-on State

This item is enabled with "WDT Output to PO2" set to "Enabled". Set the state of output from the watchdog timer when the power is turned on.



WDT Time-up State

This item is enabled with "WDT Output to PO2" set to "Enabled". Set the state of output from the watchdog timer when the watchdog timer causes a time-out.



Integrated Peripherals

This section sets configurations for your hard disk and other integrated peripherals. The first screen shows three main items for user to select. Once an item selected, a submenu appears. Details follow.

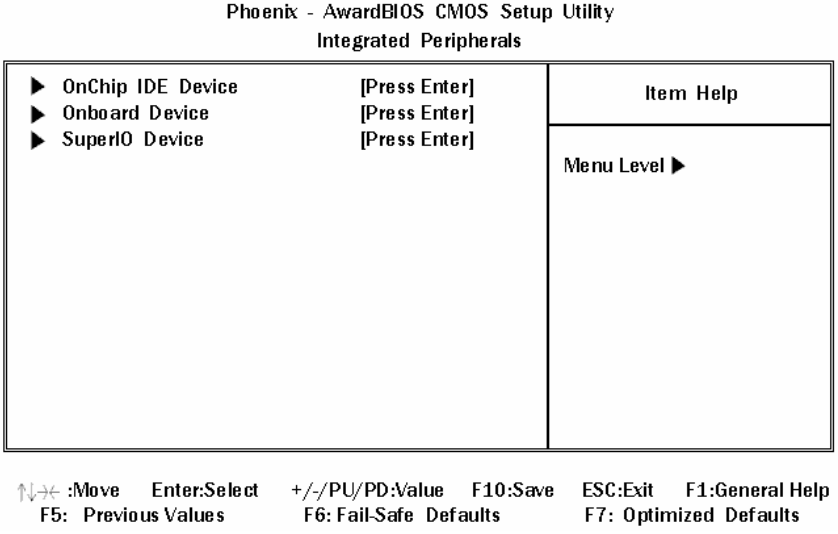

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals
OnChip IDE Device [Press Enter]
Onboard Device [Press Enter]
SuperIO Device [Press Enter]
Item Help
Menu Level ▶
:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.8. Integrated Peripherals

OnChip IDE Device

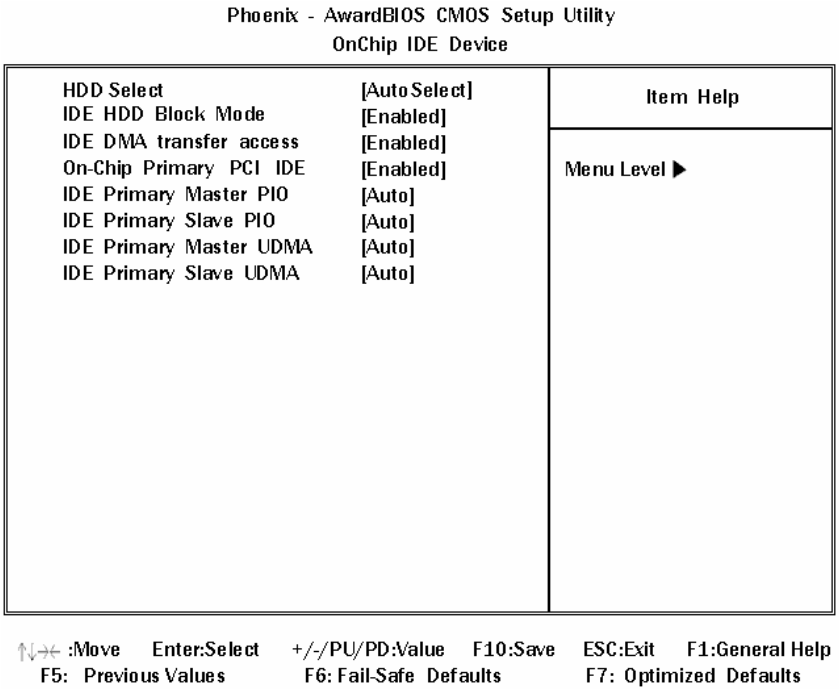
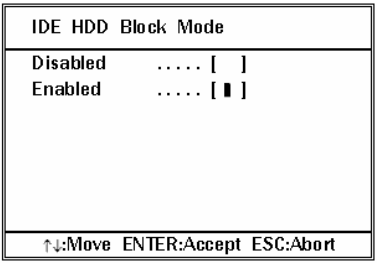
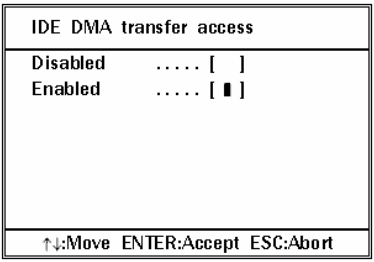
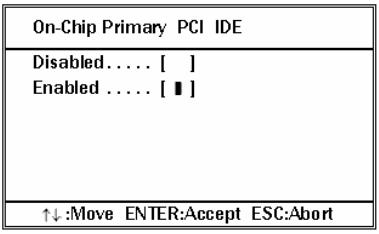

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
HDD Select [Auto Select]
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
On-Chip Primary PCI IDE [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
Item Help
Menu Level ▶
↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.9. OnChip IDE Device

Table 4.9. On Chip IDE Device Selections

Description	Choice
HDD Select You can choose your CF card type to Auto Select or UDMA 33.	HDD Select Auto Select ..... [▮] UDMA33 ..... [ ] ↑↓:Move ENTER:Accept ESC:Abort

Description	Choice
IDE HDD Block mode Block mode is also called block transfer, multiple commands, or multiple sectors read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.	
IDE DMA transfer access This item allows you to enable or disable the IDE DMA transfer access.	
On-Chip Primary PCI IDE The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately.	

Description	Choice
IDE Primary Master / Slave PIO The two IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for the one IDE device that the onboard IDE interface supports. In Auto mode, the system automatically determines the best mode for the device.	IDE Primary Master PIO Auto ..... [▮] Mode 0 ..... [ ] Mode 1 ..... [ ] Mode 2 ..... [ ] Mode 3 ..... [ ] Mode 4 ..... [ ] ↑↓:Move ENTER:Accept ESC:Abort IDE Primary Slave PIO Auto ..... [▮] Mode 0 ..... [ ] Mode 1 ..... [ ] Mode 2 ..... [ ] Mode 3 ..... [ ] Mode 4 ..... [ ] ↑↓:Move ENTER:Accept ESC:Abort
IDE Primary Master/Slave UDMA UDMA (Ultra DMA) is a DMA data transfer protocol that utilizes ATA commands and the ATA bus to allow DMA commands to transfer data at a maximum burst rate of 33 MB/s. When you select Auto in the two IDE UDMA fields, the system automatically determines the optimal data transfer rate for each IDE device.	IDE Primary Master UDMA Disabled ..... [ ] Auto ..... [▮] ↑↓:Move ENTER:Accept ESC:Abort IDE Primary Slave UDMA Disabled ..... [ ] Auto ..... [▮] ↑↓:Move ENTER:Accept ESC:Abort

Onboard Device

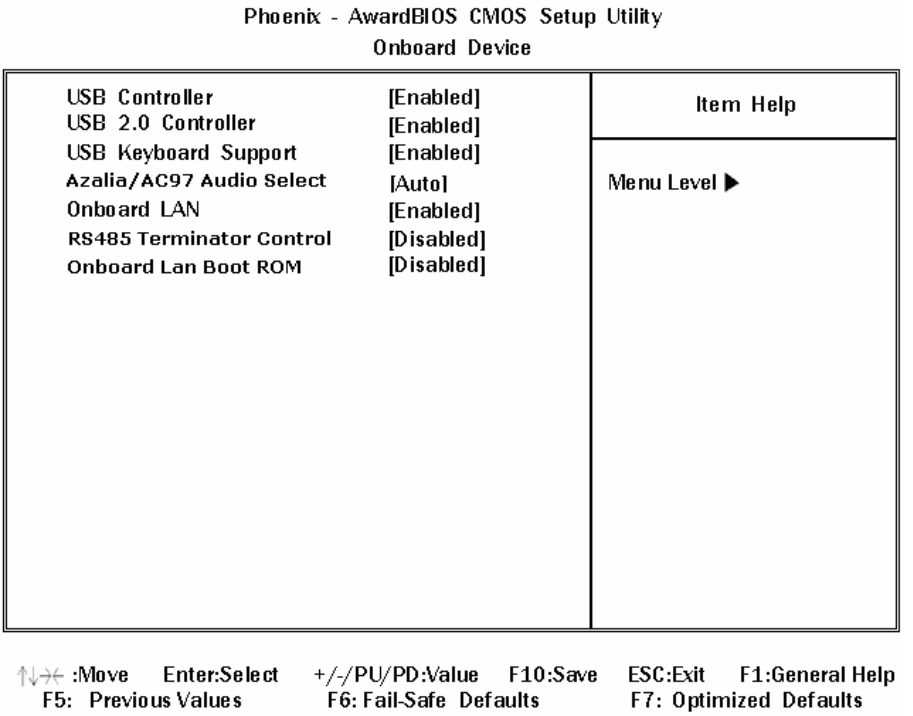
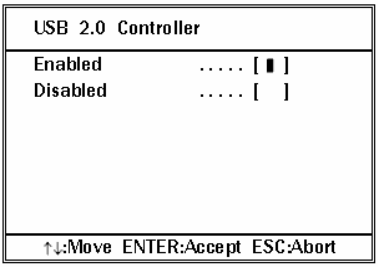
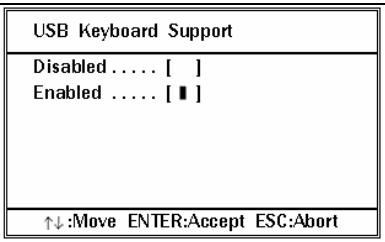
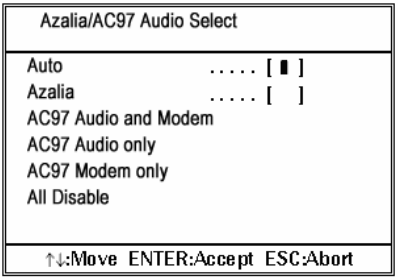
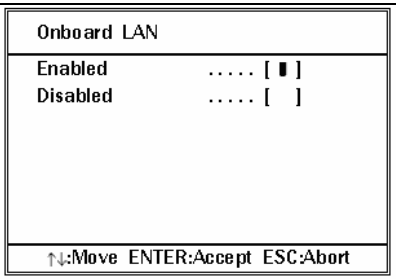
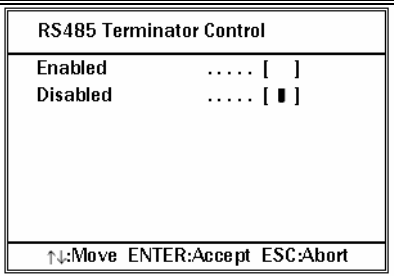
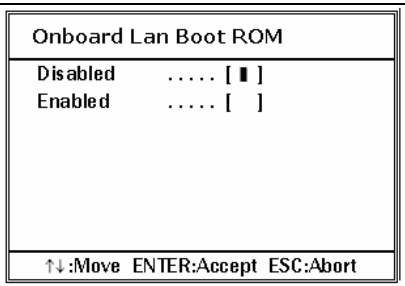

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device
USB Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Keyboard Support [Enabled]
Azalia/AC97 Audio Select [Auto]
Onboard LAN [Enabled]
RS485 Terminator Control [Disabled]
Onboard Lan Boot ROM [Disabled]
Item Help
Menu Level ▶
↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.10. Onboard Device

Table 4.10. On board device Selections

Description	Choice
USB Controller Selects enable/disable for the USB (Universal Serial Bus) controller. In normal cases, use it while "Enable".	USB Controller Enabled . . . . . [▮] Disabled. . . . . [ ] ↑↓:Move ENTER:Accept ESC:Abort

Description	Choice
USB 2.0 Controller Enable or disable the Onboard USB 2.0 function. In normal cases, use it while "Enable".	
USB Keyboard Support Select "Enabled" when using the USB keyboard.	
Azalia / AC97 Audio Select Select audio function and/or enable or disable device(s). In normal cases, set it as "Auto".	
Onboard LAN Select "Disabled" if you don't want to use Onboard LAN controller.	

Description	Choice
RS485 Terminator Control Sets Enabled / Disabled for the terminating resistance for RS422/485. If set in “Disabled”, there is no terminating resistance. If set in “Enabled”, it is terminated with 120Ω resistance.	
Onboard LAN Boot ROM Select “Enabled” when PXE network boot up is to be performed.	

Super IO Device

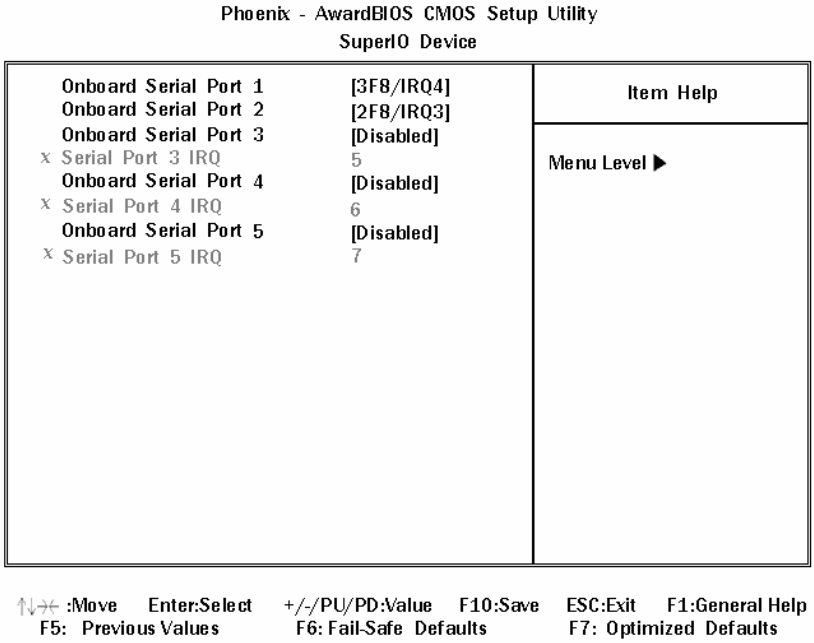
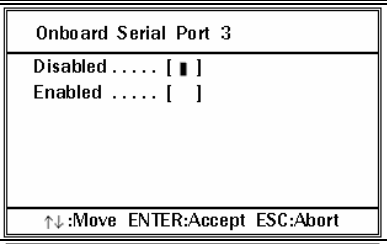
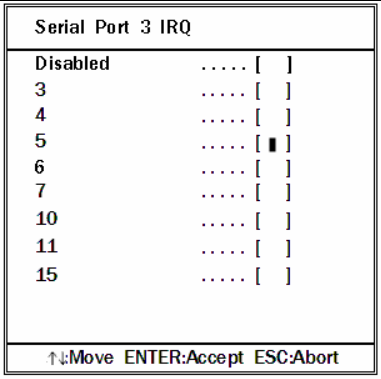
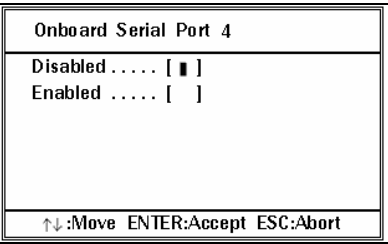
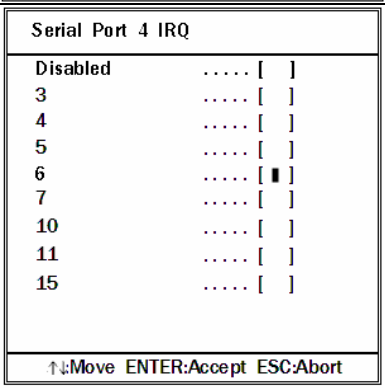
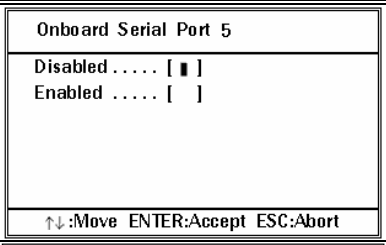
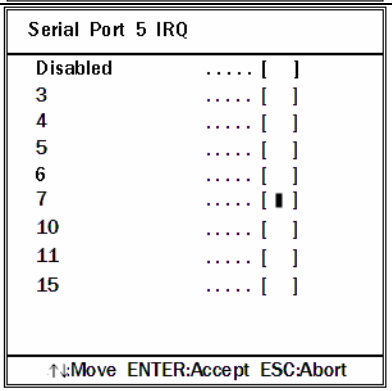

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Serial Port 3 [Disabled]
x Serial Port 3 IRQ 5
Onboard Serial Port 4 [Disabled]
x Serial Port 4 IRQ 6
Onboard Serial Port 5 [Disabled]
x Serial Port 5 IRQ 7
Item Help
Menu Level ▶
↑↓→← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.11. Super IO Device

Table 4.11. Super I/O device Selections

Description	Choice
Onboard Serial Port 1 Select an address and corresponding interrupt for the first serial port.	Onboard Serial Port 1 Disabled ..... [ ] 3F8/IRQ4..... [▮] 2F8/IRQ3..... [ ] 3E8/IRQ4..... [ ] 2E8/IRQ3..... [ ] Auto ..... [ ] ↑↓:Move ENTER:Accept ESC:Abort
Onboard Serial Port 2 Select an address and corresponding interrupt for the second serial port.	Onboard Serial Port 2 Disabled ..... [ ] 3F8/IRQ4..... [ ] 2F8/IRQ3..... [▮] 3E8/IRQ4..... [ ] 2E8/IRQ3..... [ ] Auto ..... [ ] ↑↓:Move ENTER:Accept ESC:Abort

Description	Choice
Onboard Serial Port 3 Sets enable/disable for the third serial port. This serial port is for the touch panel when it is used on the display device using LVDS connection. The I/O address is fixed in 2A0H.	
Serial Port 3 IRQ Select the IRQ to use in the third serial port.	
Onboard Serial Port 4 Sets enable/disable for the fourth serial port. This serial port should be set to Disable since it is for the device of future expansion. The I/O address is fixed in 2A8H.	
Serial Port 4 IRQ Select the IRQ to use in the fourth serial port.	

Description	Choice
Onboard Serial Port 5 Sets enable/disable for the fifth serial port. This serial port should be set to Disable since it is for the device of future expansion. The I/O address is fixed in 2B0H.	
Serial Port 5 IRQ Select the IRQ to use in the fifth serial port.	

Power Management Setup

The Power Management Setup allows you to configure you system to most effectively save energy while operating in a manner consistent with your own style of computer use.

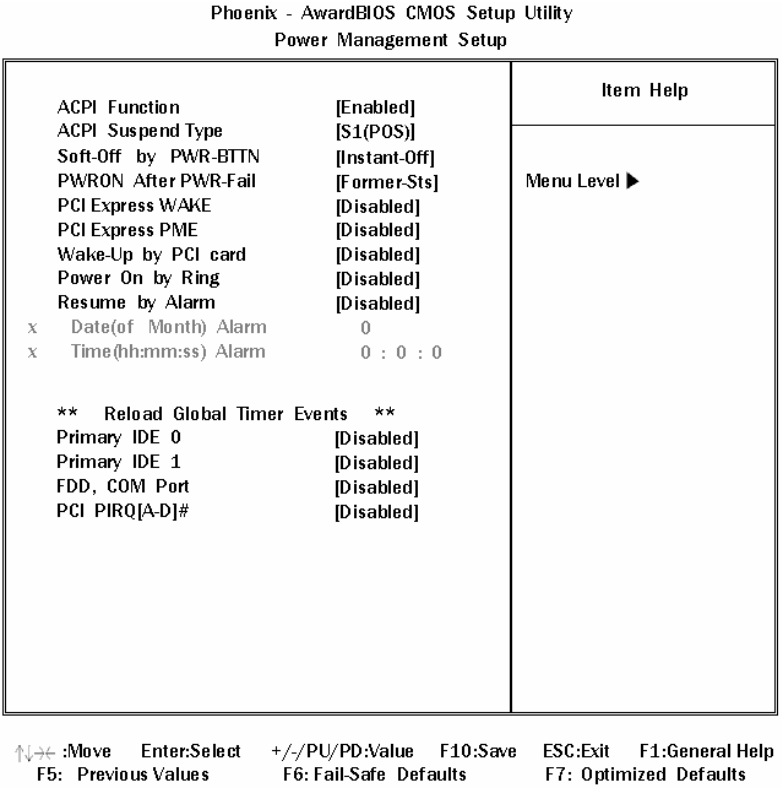
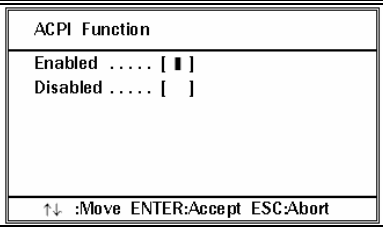
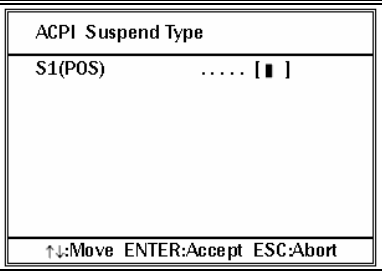
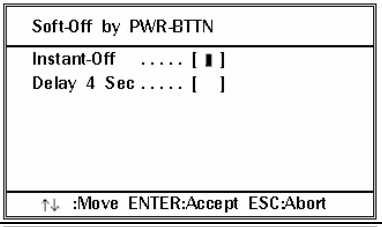
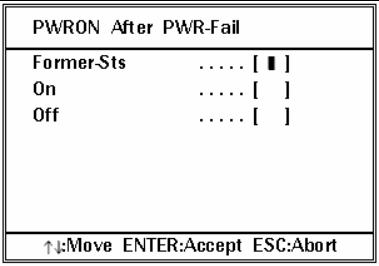
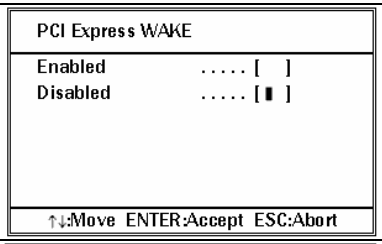
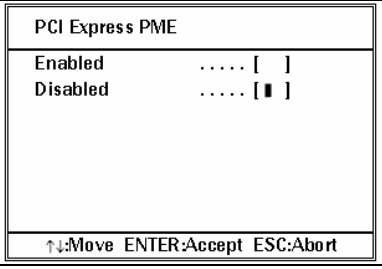

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
Item Help
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
Soft-Off by PWR-BTTN [Instant-Off]
PWRON After PWR-Fail [Former-Sts]
PCI Express WAKE [Disabled]
PCI Express PME [Disabled]
Wake-Up by PCI card [Disabled]
Power On by Ring [Disabled]
Resume by Alarm [Disabled]
x Date(of Month) Alarm 0
x Time(hh:mm:ss) Alarm 0 : 0 : 0
** Reload Global Timer Events **
Primary IDE 0 [Disabled]
Primary IDE 1 [Disabled]
FDD, COM Port [Disabled]
PCI PIRQ[A-D]# [Disabled]
Menu Level ▶
:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

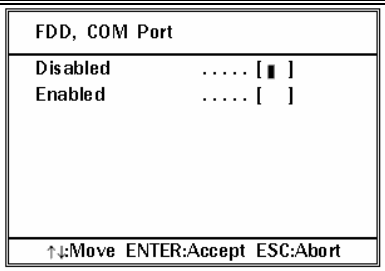
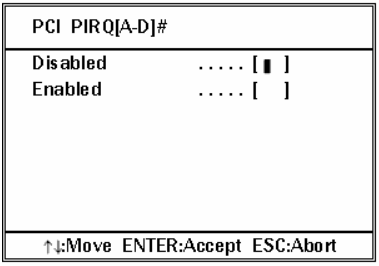
Figure 4.12. Power Management Setup

Table 4.12. Power Management setup Selections

Description	Choice
ACPI Function When set to 'Enabled', turns on the ACPI Function. By default, this field is "Enabled". If you change this value after Windows Installation, you should install OS again.	
Note: ACPI (Advanced Configuration and Power Interface) is a power management specification that makes hardware status information available to the operating system ACPI enables a computer to turn its peripherals on and off for improved power management. It also allows the computer to be turned on and off by external devices, so that mouse or keyboard activity wakes up the computer.	

Description	Choice
ACPI Suspend Type Only "S1(POS)" is supported for the ACPI suspense mode.	
Soft-Off by PWR-BTTN In case of Soft-Off (S5) by the power button, specifies the delay time to wait till the power button takes effect. In "Instant-Off", the power button takes effect immediately after pushed down. In "Delay 4 sec", the power button needs to be pushed and held for 4 seconds to take effect. Note that the power button is controlled by the OS in case of Windows.	
PWRON after PWR-Fail Specifies the behavior (boot condition) when the power is recovered after the power-related malfunction such as a power failure. In "Former-Sts", the condition is returned to the state when the malfunction occurred. Always booted in "On", and never booted in "OFF".	
PCI Express WAKE By default, this field is "Disabled". Selecting "Enable" enables On board Lan "WOL" function. Note that the "Wake-Up by PCI Card" setting below should be Enable alike.	
PCI Express PME By default, this field is Disabled. For Add on PCI-E Card PME Usually select "Disabled".	

Description	Choice
Wake-Up by PCI card Selecting “Enable” enables On board Lan “WOL” function. Note that the “PCI Express Wake” setting below should be Enable alike.	Wake-Up by PCI card Disabled . . . . . [▮] Enabled . . . . . [ ] ↑↓ :Move ENTER:Accept ESC:Abort
Power On by Ring When set to "Enabled", you can boot the system by incoming call (Ring signal) to the modem connected COM1 or COM2.	Power On by Ring Disabled . . . . . [▮] Enabled . . . . . [ ] ↑↓:Move ENTER:Accept ESC:Abort
Resume by Alarm When Enabled, your can set the date and time at which the RTC (real-time clock) alarm awakens the system.	Resume by Alarm Disabled . . . . . [▮] Enabled . . . . . [ ] ↑↓:Move ENTER:Accept ESC:Abort
Date(of Month) Alarm Min= 0 Max= 31 Key in a DEC number : ↑↓:Move ENTER:Accept ESC:Abort	Time(hh:mm:ss) Alarm Min= 0 Max= 23 Key in a DEC number : ↑↓:Move ENTER:Accept ESC:Abort
Reload Global Timer Events: When Enabled, an event occurring on each listed device restarts the global timer for Standby mode.	
Primary IDE 0 Disabled . . . . . [▮] Enabled . . . . . [ ] ↑↓:Move ENTER:Accept ESC:Abort	Primary IDE 1 Disabled . . . . . [▮] Enabled . . . . . [ ] ↑↓:Move ENTER:Accept ESC:Abort

Description	Choice
	

PnP/PCI Configuration Setup

This section describes configuring the PCI bus system. PCI, or Personal Computer Interconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

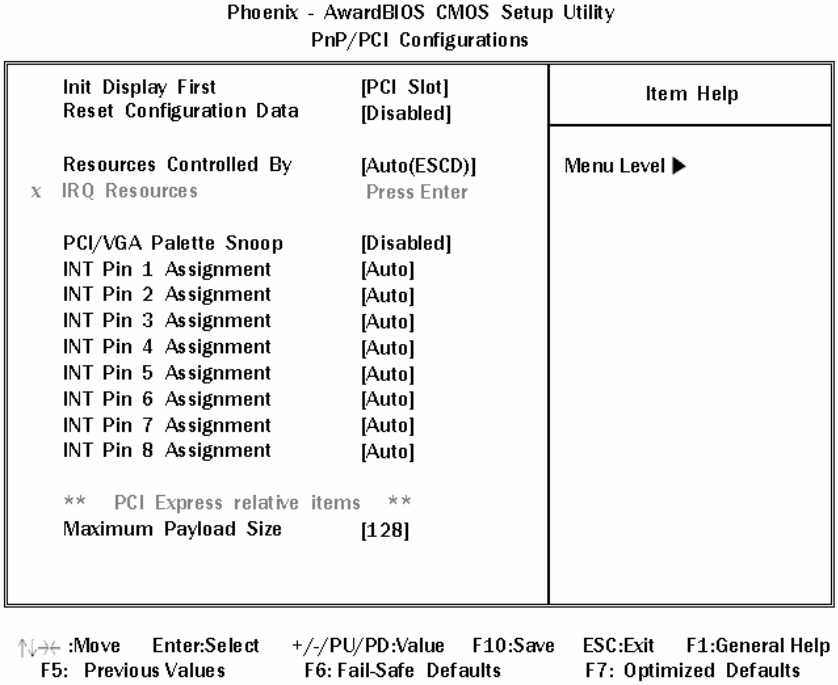
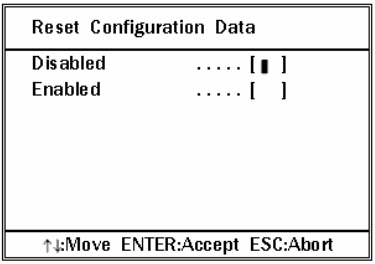
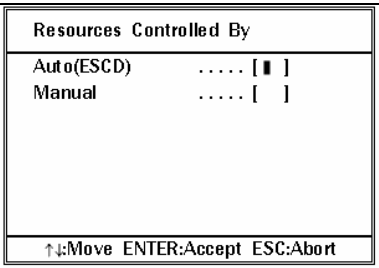

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations
Init Display First [PCI Slot]
Reset Configuration Data [Disabled]
Resources Controlled By [Auto(ESCD)]
x IRQ Resources Press Enter
PCI/VGA Palette Snoop [Disabled]
INT Pin 1 Assignment [Auto]
INT Pin 2 Assignment [Auto]
INT Pin 3 Assignment [Auto]
INT Pin 4 Assignment [Auto]
INT Pin 5 Assignment [Auto]
INT Pin 6 Assignment [Auto]
INT Pin 7 Assignment [Auto]
INT Pin 8 Assignment [Auto]
** PCI Express relative items **
Maximum Payload Size [128]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.13. PnP/PCI Configuration Setup

Table 4.13. PCI PnP/PCI Configuration Setup Selections

Description	Choices
Init Display First Initialize the onboard video display before initializing any other display device on the system. Thus the onboard display becomes the primary display.	Init Display First PCI Slot ..... [▮] Onboard ..... [ ] ↑↓:Move ENTER:Accept ESC:Abort

Description	Choices
Reset Configuration Data Normally, you leave this field Disabled. When you want to reset the resource assignment for the change of Enable / Disable of COM or other reasons, set this field to Enabled. After BIOS setup, ESCD (Extended System Configuration Data) should be reset.	
Resource Controlled by The Award Plug and Play BIOS can automatically configure all the boot and Plug and Play – compatible devices. If you select Auto, all the interrupt request (IRQ) and DMA assignment fields disappear, as the BIOS automatically assigns them	

IRQ n Resources

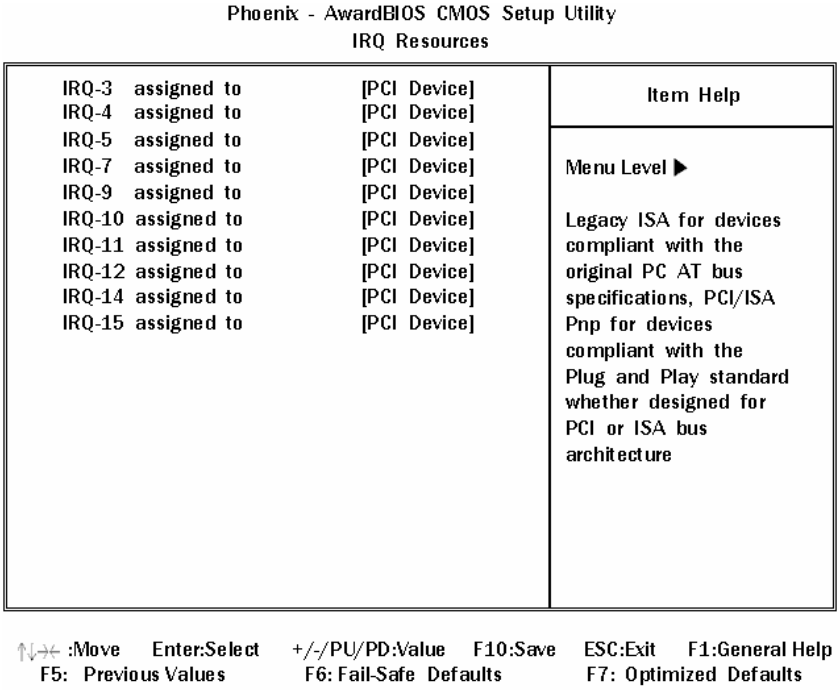

Phoenix - AwardBIOS CMOS Setup Utility
IRQ Resources
IRQ-3 assigned to [PCI Device]
IRQ-4 assigned to [PCI Device]
IRQ-5 assigned to [PCI Device]
IRQ-7 assigned to [PCI Device]
IRQ-9 assigned to [PCI Device]
IRQ-10 assigned to [PCI Device]
IRQ-11 assigned to [PCI Device]
IRQ-12 assigned to [PCI Device]
IRQ-14 assigned to [PCI Device]
IRQ-15 assigned to [PCI Device]
Item Help
Menu Level ▶
Legacy ISA for devices compliant with the original PC AT bus specifications, PCI/ISA Pnp for devices compliant with the Plug and Play standard whether designed for PCI or ISA bus architecture
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

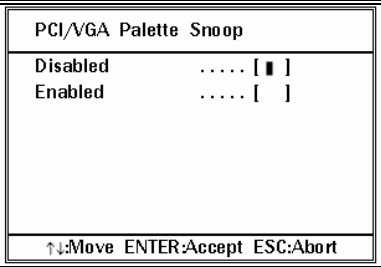
Figure 4.14. IRQ n Resources

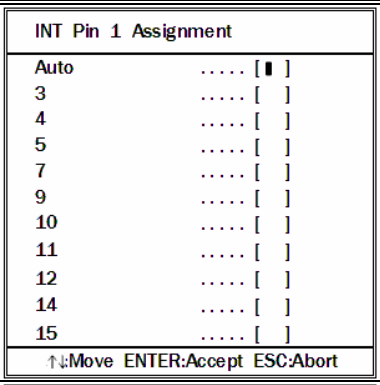
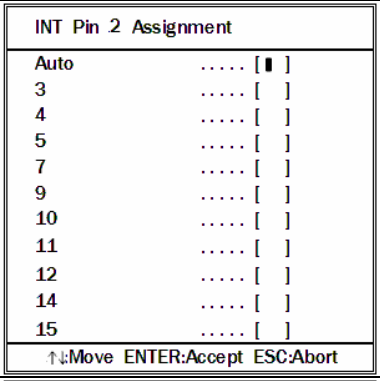
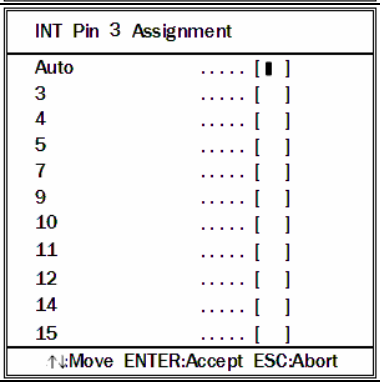
When resources are controlled manually, assign each system interrupt as on of the following type, depending on the type of device using the interrupt.

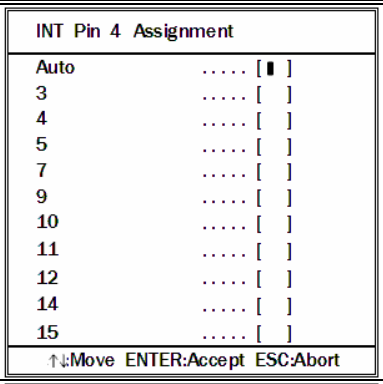
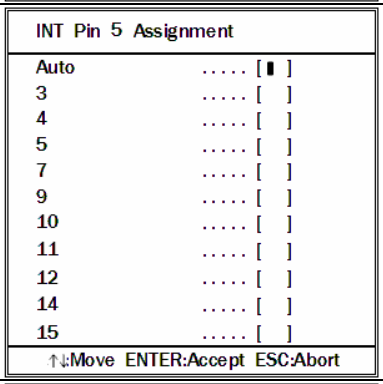
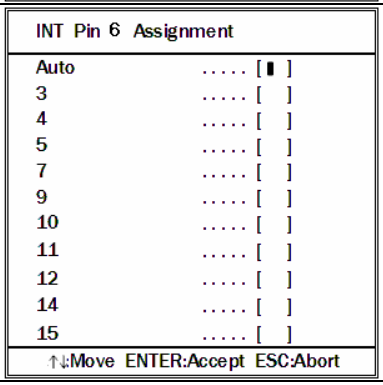
Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt (Such as IRQ4 for serial port 1)

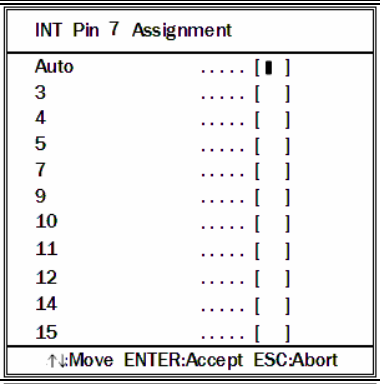
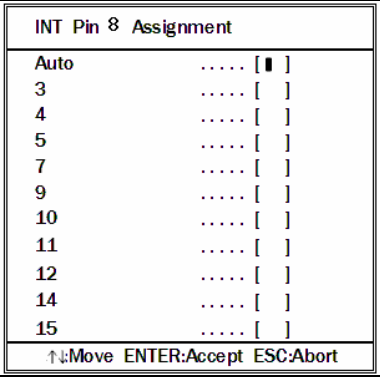
PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

The Choice : Legacy ISA and PCI/ISA PnP

Description	Choices
PCI/VGA Palette Snoop This function is not supported. Keep this value “Disabled”.	

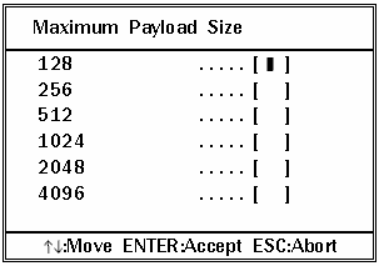
Description	Choices
INT Pin 1 Assignment Usually select “Auto”. Devices(s) using this INT ： Display Controller - Bus 0 Dev 2 Func 0 USB 1.0/1.1 UHCI Controller - Bus 0 Dev 29 Func 3	
INT Pin 2 Assignment Usually select “Auto”. Devices(s) using this INT ： Multimedia Device - Bus 0 Dev 30 Func 2	
INT Pin 3 Assignment Usually select “Auto”. Devices(s) using this INT ： USB 1.0/1.1 UHCI Controller - Bus 0 Dev 29 Func 2	

Description	Choices
INT Pin 4 Assignment Usually select "Auto". Devices(s) using this INT : IDE Controller - Bus 0 Dev 31 Func 2 USB 1.0/1.1 UHCI Controller - Bus 0 Dev 29 Func 1 SMBus Controller - Bus 0 Dev 31 Func 3	
INT Pin 5 Assignment Usually select "Auto". Devices(s) using this INT : Network Controller - Bus 1 Dev 8 Func 0 Simple Communication Controller - Bus 0 Dev 30 Func 3	
INT Pin 6 Assignment Usually select "Auto". Devices(s) using this INT : - Reserved	

Description	Choices
INT Pin 7 Assignment Usually select “Auto”. Devices(s) using this INT : - Reserved	
INT Pin 8 Assignment Usually select “Auto”. Devices(s) using this INT : USB 1.0/1.1 UHCI Controller - Bus 0 Dev 29 Func 0 USB 2.0 EHCI Controller - Bus 0 Dev 29 Func 7	

PCI Express relative items

Table 4.14. PCI Express Relative Items Selections

Description	Choices
Maximum Payload Size Set maximum TLP payload size for the PCI Express Devices. The unit is byte.	

PC Health Status

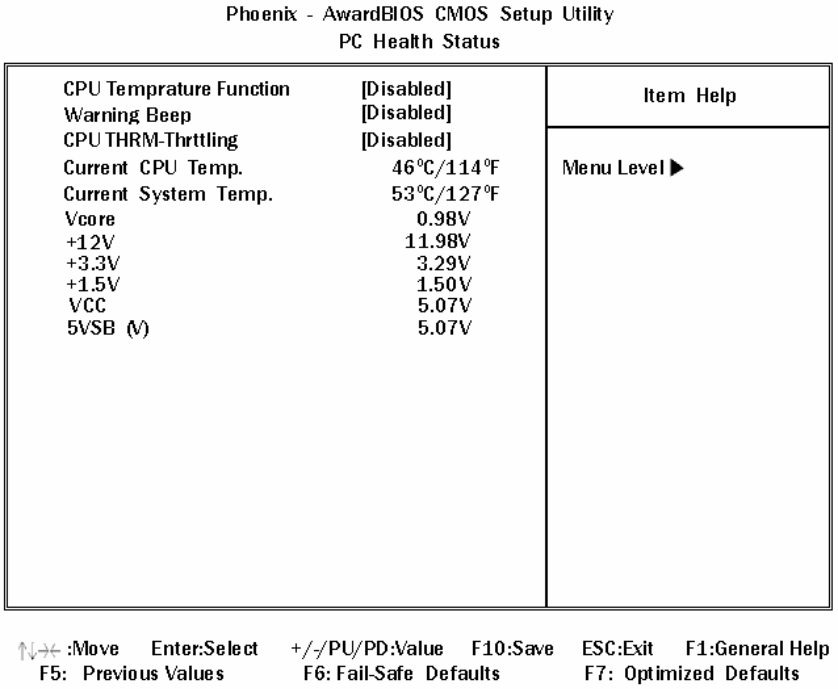
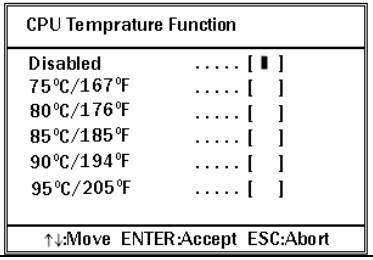
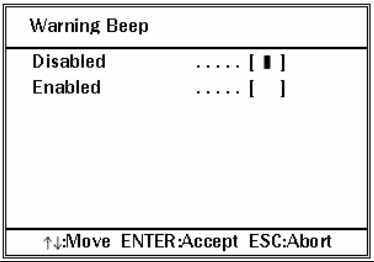
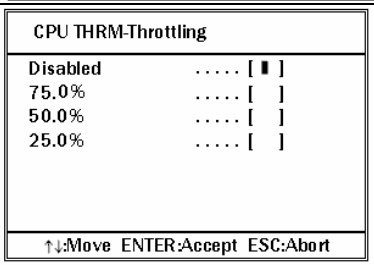


Figure 4.15. PC Health Status

The BIOS shows the PC health status in this window.

Table 4.15. PC Health Status Selections

Description	Choices
CPU Temperature Function When using "Warning Beep" and "CPU THRM-Throttling" below, specifies the threshold temperature to the CPU temperature.	
Warning Beep Disabled : Disables this function. Enabled : Beep will sound as a warning when the temperature exceeds the value set in "CPU Temperature Function" above.	
CPU THRM-Throttling When the temperature exceeds the value set in "CPU Temperature Function" above, the slot ring is activated in selected percentages to restrain the heat generation from CPU. Note that the operation in Windows is not supported.	
Current CPU Temp.	This field displays the current CPU temperature.
Current System Temp.	This field displays the current system temperature.
Vcore / +12V / +3.3V / +1.5V / VCC / 5VSB	This field displays the current voltage.

Frequency/Voltage Control

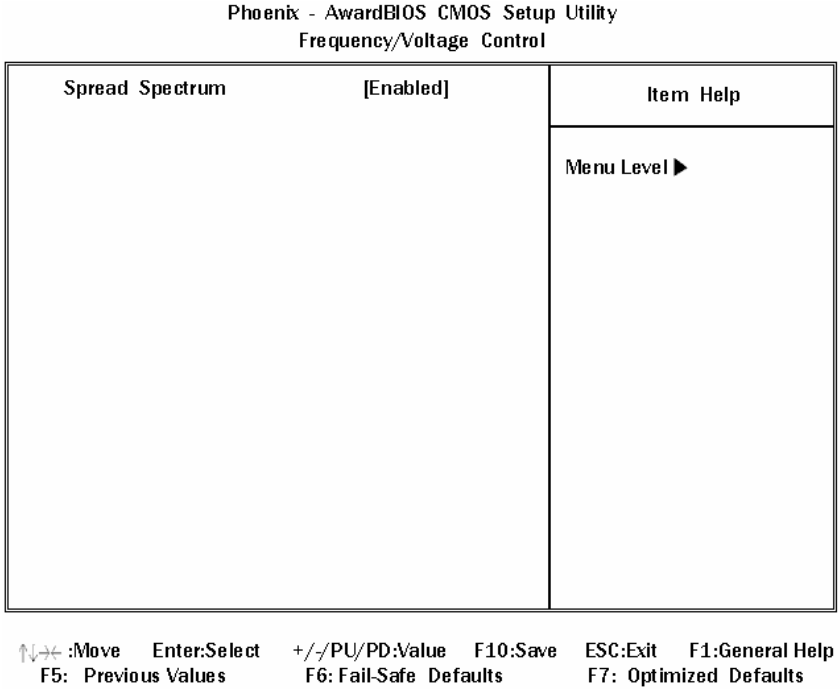

Phoenix - AwardBIOS CMOS Setup Utility
Frequency/Voltage Control
Spread Spectrum
[Enabled]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 4.16. Frequency/Voltage Control

Table 4.16. Frequency/Voltage Control Selections

Description	Choices
Spread Spectrum When the system clock generator pulses, the extreme values of the pulse generate excess EMI. Enabling pulse spectrum spread modulation changes the extreme values from spikes to flat curves, thus reducing EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.	Spread Spectrum Disabled ..... [ ] Enabled ..... [■] ↑↓:Move ENTER:Accept ESC:Abort

Defaults Menu

Selecting “Defaults” from the main menu shows you two options which are described below

Load Fail-Safe Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N) ? N

Pressing ‘Y’ loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N) ? N

Pressing ‘Y’ loads the default values that are factory settings for optimal performance system operations.

Supervisor /User Password Setting

You can set either supervisor or user password, or both of then. The differences between are:

SUPERVISOR PASSWORD: can enter and change the options of the setup menus.

USER PASSWORD: just can only enter but do not have the right to change the options of the setup menus. When you select this unction, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD:

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to “System”, the password will be required both at boot and at entry to Setup. If set to “Setup”, prompting only occurs when trying to enter Setup.

Exit Selecting

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation :

Save to CMOS and EXIT (Y/N)? Y

Pressing “Y” stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit without saving (Y/N)? Y

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

POST Messages

During the Power On Self-Test (POST), if the BIOS detects an error requiring you to do something to fix, it will either sound a beep code or display a message.

If a message is displayed, it will be accompanied by:

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

POST Beep

Currently there are two kinds of beep codes in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps. The other code indicates that your DRAM error has occurred. This beep code consists of a single long beep repeatedly.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes messages for both the ISA and the EISA BIOS.

CMOS battery has failed

CMOS battery is no longer functional. It should be replaced.

Disk boot failed

[INSERT SYSTEM DISK AND PRESS ENTER]

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain proper system boot files. Make sure the connection of boot drive and its content.

Error encountered initializing hard drive

Disk drive cannot be initialized. Be sure all recording media such as HDD/SSD/CF are installed correctly. Also be sure the correct hard drive type is selected in Setup.

Error initializing hard disk controller

Cannot initialize disk drive controller. Be sure all recording media such as HDD/SSD/CF are installed correctly. Also be sure the correct hard drive type is selected in Setup.

Keyboard error or no keyboard present

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

Memory address error at…

Indicates a memory address error at a specific location.

Press a key to REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot.

Press F1 to disable NMI, F2 to REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

System halted, (CTRL-ALT-DEL) to REBOOT…

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

Hard disk(s) fail (80)

Disk drive reset failed.

Hard disk(s) fail (40)

Disk drive controller diagnostics failed.

Hard disk(s) fail (20)

Disk drive initialization error.

Hard disk(s) fail (10)

Unable to recalibrate disk drive.

Hard disk(s) fail (08)

Sector Verify failed.

Keyboard is locked out – Unlock the key

This product does not support Keyboard Lock. If this message was shown, keyboard controller may be broken.

Keyboard error or no keyboard present

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

BIOS ROM checksum error – System halted

The checksum of ROM address F0000H-FFFFFH is bad. It indicates that hardware broke down or content of ROM was changed.

Memory test fail

BIOS reports the memory tests fail if the onboard memory is tested error.

Error loading operating system

Invalid System disk

It indicates that Boot Record Program in Disk (not in BIOS) failed to load OS. Make sure content of Disk.

Locations and Settings of CMOS/ROM Clear Jumpers

If an unexpected activation failure occurs due to the BIOS setting, the CMOS/ROM clear jumper can be set in order to disable the BIOS setting and start up the system.
In the normal operation, leave the CMOS/ROM clear jumper to the factory setting (1-3, 2-4 short).

⚠ CAUTION

The heat sink block of this product may be overheated. Touching the product immediately after it is switched off may cause burning. When setting the jumper, let it cool completely beforehand.

(1) Remove the cover first then heat sink from the product.
(number of screws, cover : 12, chassis : 5)

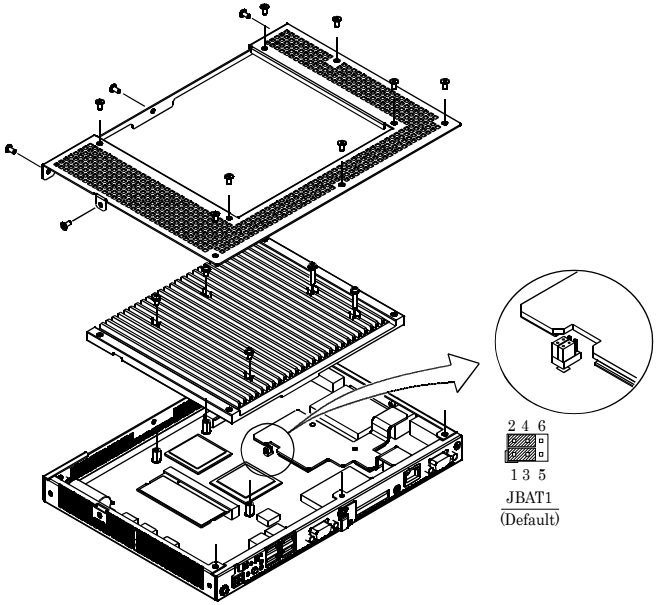


Figure 4.17. Removal of Cover and Heat Sink and Locations of CMOS/ROM Clear Jumpers

When the cover and heat sink is removed, the CMOS/ROM clear jumper (JBAT1) will appear, as shown in the above figure.

(2) Set the CMOS/ROM clear jumper (JBAT1) to “3-5 short”. When about ten seconds have elapsed, set it back to “1-3 short”.
(3) Set the CMOS/ROM clear jumper (JBAT1) to “4-6 short”.
(4) Install the heat sink to the place where it was.
Do not tighten screws with excess force. The tightening torque should be 4kg/cm or less.
(5) Start the BIOS setup screen for resetting and then turn off the power.
(6) Remove the heat sink and then set the CMOS/ROM clear jumper (JBAT1) back to “2-4 short”.
(7) Mount the heat sink and cover in the reverse procedure of removing them.

⚠ CAUTION

- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. Take special cares not to break the heat conduction sheet when remove/install the heat sink.
- When removing the screws which secure the cover and heat sink, follow instructions below. In case of mishandling, the threaded hole could be stripped.
  - When removing the cover and heat sink, use screwdriver tips shown below respectively : Cover : (+)No.1, heat sink : (+)No.2
  - Do not use the electric screwdriver when removing screws of the cover.
  - When removing screws, make sure that the product is cool enough. It is occasionally extremely difficult to loosen screws when just after the operation.

5. Each Component Function

Component Name

Front View

IPC-BX950Tx-DCxxx

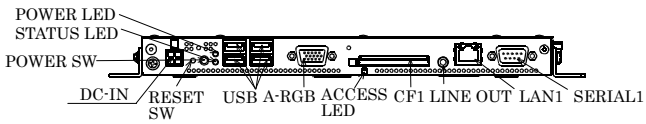


Figure 5.1. Component Name ***< 1 / 2 >***

Side View

IPC-BX950Tx-DCxxx

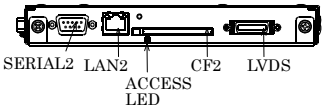


Figure 5.1. Component Name ***< 2 / 2 >***

Table 5.1. Component Function

Name	Function
POWER-SW	Power switch
RESET SW	Hardware reset switch
POWER LED	Power ON display LED
ACCESS LED	IDE disk access display LED
STATUS LED	Status LED
DC-IN	DC power input connector
LINE OUT	Line out (ϕ3.5 PHONE JACK)
LAN1	Ethernet 1000BASE-TX/100BASE-T/10BASE-T RJ-45 connector
LAN2	Ethernet 1000BASE-TX/100BASE-T/10BASE-T RJ-45 connector
USB	USB port connector x 4
SERIAL1	Serial port 1 connector (9pin D-SUB/male)
SERIAL2	Serial port 2 connector (9pin D-SUB/male)
A-RGB	Display (15pin D-SUB/female)
LVDS	LVDS (26pin half pitch connector)
CF1	CF card slot (IDE connection mastering)
CF2	CF card slot (IDE connection slaving)

The following function is silk-printed but it is not equipped in this product.

HDMI	HDMI(19 pin HDMI connector)
RAS	RAS connector (26 pin)
PCIe	PCI Express Cable connector (18 pin)
e-SATA	e-SATA (7 pin connector)

System Configuration

IPC-BX950Tx-DCxxx

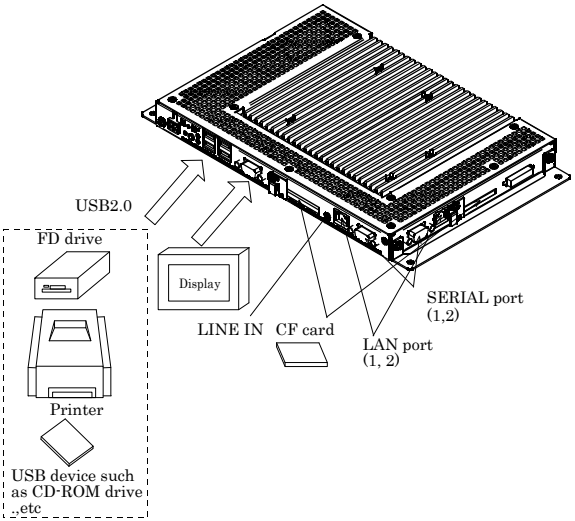


Figure 5.2. System Configuration

Component Function

LED: POWER, ACCESS, STATUS

There are three LED in the front of this board.

Table 5.2. Display Contents of LED

LED name	State	Display contents
POWER LED	OFF	Indicates that this product is switched off.
	ON (Green)	Indicates that this product is switched on.
ACCESS LED	ON (Orange)	Indicates that the IDE device is being accessed.
STATUS LED	OFF	You can control the behavior of LED from the user application. *1
	Flashing, ON (Yellow)	You can control the behavior of LED from the user application. *1

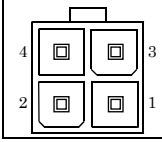
*1 API that controls STATUS LED is available.
See the API description file "mtdll_e.chm" included in /RasUtility/Samples in the attached CD-ROM [IPC-SLIB-01] for details.

DC Power Input Connector: DC-IN

To supply the power, always use the power supply listed below.

Power voltage: 12 - 24VDC±5%
Power capacity: 12V 3.4A or more, 24V 1.9A or more

Table 5.3. DC Power Connector

Connector type	9360-04P (mfd. by ALEX)			
	Pin No.	Signal name	Pin No.	Signal name
	4	12 - 24V	3	12 - 24V
	2	GND	1	GND

Applicable connector on the connector side

Housing: 9357-04 (mfd. by ALEX) or 5557-04R (mfd. by MOLEX)
Contact: 4256T2-LF (AWG18-24)(mfd. by ALEX) or 5556 (AWG18-24)(mfd. by MOLEX)

Rise time of power supply

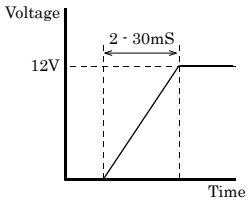


Figure 5.3. Graph of Rise Time of Power Supply

POWER SW

POWER SW is provided.

RESET SW

A hardware reset switch is provided. The switch is designed to be difficult to press in order to prevent it from being pressed by mistake. Therefore, use a pointy object.

Line out Interface: LINE OUT

A line output connector is provided. You can plug a headphone or amplifier-integrated speakers into this connector.

Audio driver

The audio driver is required to use the microphone input and line output interfaces.

Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

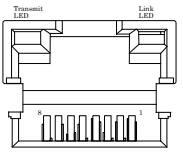
Fast-Ethernet: LAN 1 - 2

The BOX-PC is equipped with two channels for Fast-Ethernet.

- Network type : 1000BASE-T/100BASE-TX/10BASE-T
- Transmission speed * : 1000M/100M/10M bps
- Max. network path length : 100m/segment
- Controller : Intel 82573L

* Operation at 1000Mbps requires a category 5e cable.

Table 5.4. Ethernet Connector

	Pin No.	Function	
		100Base-TX	1000Base-T
LAN 	1	TX+	TRD+(0)
	2	TX-	TRD-(0)
	3	RX+	TRD+(1)
	4	NC	TRD+(2)
	5	NC	TRD-(2)
	6	RX-	TRD-(1)
	7	NC	TRD+(3)
	8	NC	TRD-(3)

LEDs for display of network statuses:

Right LED: Link LED

Normal connection: Green ON, Operation: Green Blinking

Left LED: Operation LED

10M: Off, 100M: Green, 1000M: Orange

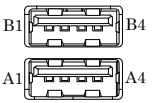
LAN drivers

Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

USB Ports

The BOX-PC is equipped with four channels for USB 2.0 interface.

Table 5.5. USB Connector

	Pin No.	Function
	A1	USB_VCC
	A2	USB-
	A3	USB+
	A4	USB_GND

Serial Port Interface: SERIAL1 - 2

SERIAL1, 2, 3 (RS-232C Ports)

The product has five channels of RS-232C compliant serial ports supporting up to a baud rate of 115,200bps with a 16-byte transmission-dedicated data buffer and a 16-byte reception-dedicated data buffer. You can use “Chapter 4 BIOS Setup” to configure an I/O address, interrupt and unused state for each of the ports independently. (The same I/O address and IRQ cannot be shared with any other device.)
Please refer to “Chapter 6 I/O Port Addresses” for more information on I/O address and register function.

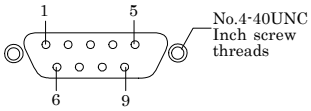
Table 5.6. SERIAL 1, 2, 3, 4, 5 I/O Addresses and Interrupts

SERIAL	I/O address	Interrupt
1	3F8h - 3FFh	IRQ 4
2	2F8h - 2FFh	IRQ 3
3 (For touch panel communication) *1	2A0h-2A7h	IRQ5
4 (system reserved) *2	2A8h-2AFh	IRQ6
5 (system reserved) *2	3B0h-3B7h	IRQ7

*1 Set as Disable when shipped. If you use the touch panel for the display device using LVDS connection, set to Enable. The I/O address is fixed and can not be changed.

*2 Set as Disable when shipped. Not available since it is for the reserved device for the functional expansion in future. The I/O address is fixed and can not be changed.

Table 5.7. Serial Port Connector

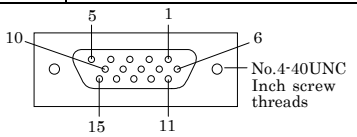
Connector used on the product	9-socket D-SUB (MALE)		
			
Pin No.	Signal name	Meaning	Direction
1	CD	Carrier detect	Input
2	RD	Received data	Input
3	TD	Transmitted data	Output
4	DTR	Data terminal ready	Output
5	GND	Signal ground	-----
6	DSR	Data set ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Ring indicator	Input

Display Interface: VGA

Connector for display connection is provided. Connector name is VGA(HD-SUB 15P).

When used together with an LVDS interface, it enables dual screen display.

Table 5.8. Display Connector

Connector type	HD-SUB 15 pin (FEMALE)		
			
Pin No.	Signal name	Pin No.	Signal name
1	RED	9	+5V
2	GREEN	10	GND
3	BLUE	11	N.C.
4	N.C.	12	DDCDATA
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDCCLK
8	GND		

For the LCDs that can be connected, please refer to “Chapter 7 List of Options”.

Display driver

Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

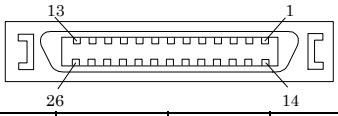
⚠ CAUTION

When the analog display is used, Windows MS-DOS may not be properly displayed in full-screen mode.
This is because the frequency and resolution of Windows and MS-DOS (full-screen display) are the same due to the screen settings while the display parameters are different.
For display, as only one parameter can be stored for one frequency or resolution, only either of Windows or MS-DOS screen can be displayed properly.
In this case, change the resolution or display frequency of Windows so that it is not the same as for the MS-DOS display.

LVDS Interface: LVDS

The LVDS connector is a 26-pin half pitch connector.
A liquid crystal panel with the following resolution can be connected to this product.
System resolution : 640 x 480 (260,000 colors), 800 x 600 (260,000 colors), 1,024 x 768(260,000 colors)
When used together with a display interface, it enables dual screen display.

Table 5.9. LVDS Connector

Connector used on the product	Half pitch 26-socket connector (DX10G1M-26SE or equivalence to it)		
			
Pin No.	Signal name	Pin No.	Signal name
1	BLK_EN	14	RESERVED
2	RXD	15	RESERVED
3	TXD	16	RESERVED
4	DDCCLK	17	DDCDATA
5	GND	18	GND
6	A_CLK-	19	RESERVED
7	A_CLK+	20	RESERVED
8	GND	21	GND
9	A_TX2-	22	RESERVED
10	A_TX2+	23	RESERVED
11	GND	24	GND
12	A_TX0-	25	A_TX1-
13	A_TX0+	26	A_TX1+

* Please do not connect anything with the RESERVED pin.

Display driver

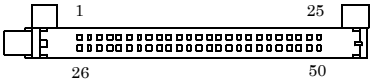
Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

CF Card Connector (Primary IDE Connection): CF1 - 2

The CF Card (Type I : dedicated to the memory card) can be connected.
Before you insert/remove the CF card, make sure that the power is switched off and the access LED is turned off.

Table 5.10. CF Card Connector

Connector used on the product	50-socket header type (1.27mm pitch)



Pin No.	Signal name	Direction	Pin No.	Signal name	Direction
1	GND		26	GND	
2	DD3	I/O	27	DD11	I/O
3	DD4	I/O	28	DD12	I/O
4	DD5	I/O	29	DD13	I/O
5	DD6	I/O	30	DD14	I/O
6	DD7	I/O	31	DD15	I/O
7	CS0-	Output	32	CD3-	Output
8	GND		33	GND	
9	GND		34	DIOR-	Output
10	GND		35	DIOW-	Output
11	GND		36	+3.3V	
12	GND		37	INTRQ	Input
13	+3.3V		38	+3.3V	
14	GND		39	CSEL-	Output
15	GND		40	N.C	
16	GND		41	RESET-	Output
17	GND		42	IOCHRDY	Input
18	DA2	Output	43	DDRQ	Input
19	DA1	Output	44	DDACK-	Output
20	DA0	Output	45	DACT-	Output
21	DD0	I/O	46	PDIAG-	Output
22	DD1	I/O	47	DD8	I/O
23	DD2	I/O	48	DD9	I/O
24	N.C		49	DD10	I/O
25	GND		50	GND	

6. Appendix

Memory Map

Memory Segments	Comments
00000h - 9FFFFh	0 - 640K DOS Region
A0000h - BFFFFh	Video Buffer
B0000h - B7FFFh	Monochrome Adapter range
C0000h - CBFFFh	Video BIOS
CC000h - DFFFFh	Expansion Area
E0000h - EFFFFh	Extended System BIOS Area
F0000 - FFFFFh	System BIOS Area
100000h - 7FFFFFFFh	Extended Memory Area
00100000 to Top of Main Memory	Main DRAM Address Range
Top of Main Memory	Extended SMRAM Address Range
Top of Main Memory To 4GB	PCI Memory Address Range
FEC0000h - FECFFFFFh, FEE00000h - FEEFFFFFh	APIC configuration space
FFE0000h - FFFFFFFFh	High BIOS Area

Figure 6.1. Memory Map

I/O Port Addresses

Table 6.1. I/O Port Addresses

Address	Size	Description
0000 - 000F	16 bytes	DMA controller
0010 - 001F	16 bytes	Reserved
0020 - 0021	2 bytes	PIC interrupt controller
0022 - 003F	30 bytes	Reserved
0040 - 0043	4 bytes	System timer 1
0044 - 005F	24 bytes	Reserved
0060	1 byte	Keyboard controller
0061	1 byte	NMI, speaker controller
0062 - 0063	2 bytes	Reserved
0064	1 byte	Keyboard controller
0065-006F	11bytes	Reserved
0070 - 0073	4 bytes	RTC real time clock
0074 - 007F	12bytes	Reserved
0080 - 0090	17 bytes	DMA page register
00A0 - 00A1	2 bytes	Interrupt controller 2
00A2 - 00BF	28 bytes	Reserved
00C0 - 00DE	31 bytes	DMA controller 2
00E0 - 00EF	16 bytes	Reserved
00F0 - 00FF	16 bytes	Arithmetic processor for numerical values
01F0 - 01F7	8 bytes	Primary IDE controller
0274 - 0277	4 bytes	Reserved (ISA PnP)
0279 - 0279	1 byte	Reserved
0290 - 029F	16 bytes	Hardware monitor
02A0 - 02A7	8 bytes	COM3
02A8 - 02AF	8 bytes	COM4
02B0 - 02B7	8 bytes	COM5
02F8 - 02FF	8 bytes	COM2
0388 - 038D	6 bytes	Reserved (FM synthesizer)
03B0 - 03BB	12 bytes	Video (Monochrome)
03C0 - 03DF	32 bytes	Video (VGA)
03F6	1 byte	Primary IDE
03F8 - 03FF	8 bytes	COM1
0400 - 04BF	191bytes	Reserved
04D0 - 04D1	2 bytes	Interrupt setting register (Edge/level triggered PIC)
0500 - 051F	32 bytes	Reserved
0800 - 088F	143 bytes	Reserved
0A79 - 0A79	1 byte	Reserved
0CF8 - 0CFF	4 bytes	PCI configuration register
0CF9	1 byte	Turbo and reset control register
4000 - 400F	16 byte	Reserved (RAS)

Interrupt Level List

Table 6.2. Hardware Interrupt Levels (Factory Settings)

Type	8259	Priority	Description	Vector
NMI		High	-I/O CHK	02H
IRQ0	MASTER	↑	Timer 0	08H
IRQ1	”		System reserved	09H
IRQ2	”		Interrupt controller 2 (slave)	0AH
IRQ8	SLAVE		Real-time clock	70H
IRQ9	”		System reserved	71H
IRQ10	”		Not in use (Available for users)	72H
IRQ11	”		Not in use (Available for users)	73H
IRQ12	”		Not in use (Available for users)	74H
IRQ13	”		Co-processor	75H
IRQ14	”		Primary IDE	76H
IRQ15	”		Not in use (Available for users)	77H
IRQ3	MASTER		Serial port 2 (COM2)	0BH
IRQ4	”		Serial port 1 (COM1)	0CH
IRQ5	”		Not in use (Available for users) *1	0DH
IRQ6	”	↓	Not in use (Available for users) *2	0EH
IRQ7	”	Low	Not in use (Available for users) *3	0FH

*1 IRQ5 is used as default when the serial port 3 (COM3) is set to Enable.

*2 IRQ6 is used as default when the serial port 4 (COM4) is set to Enable.

*3 IRQ7 is used as default when the serial port 5 (COM5) is set to Enable.

POST Codes

Table 6.3. POST Codes ***< 1 / 5 >***

POST (hex)	Description
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
0h1	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	Clear 8042 interface Initialize 8042 self-test
08h	Test special keyboard controller for Winbond 977 series Super I/O chips. Enable keyboard interface.
09h	Reserved
0Ah	Disable PS/2 mouse interface (optional). Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel®) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved

Table 6.3. POST Codes *< 2 / 5 >*

POST (hex)	Description
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	Program CPU internal MTRR (P6 & PII) for 0~640K memory address. Initialize the APIC for Pentium class CPU. Program early chipset according to CMOS setup. Example: onboard IDE controller. Measure CPU speed. Invoke video BIOS.
2Ah	Reserved
2Bh	Reserved
2Ch	Reserved
2Dh	Initialize multi-language Put information on screen display, including Award title, CPU type, CPU speed ….
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34h	Reserved
35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.

Table 6.3. POST Codes ***< 3 / 5 >***

POST (hex)	Description
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45h	Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	Calculate total memory by testing the last double word of each 64K page. Program writes allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	Program MTRR of M1 CPU Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. Initialize the APIC for P6 class CPU. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved
50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	Display PnP logo Early ISA PnP initialization -Assign CSN to every ISA PnP device.
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	Initialize Init_Onboard_Super_IO switch. Initialize Init_Onbaord_AUDIO switch.
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reserved
64h	Reserved
65h	Initialize PS/2 Mouse

Table 6.3. POST Codes ***< 4 / 5 >***

POST (hex)	Description
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	Assign resources to all ISA PnP devices. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".
6Eh	Reserved
6Fh	Initialize floppy controller Set up floppy related fields in 40:hardware.
70h	Reserved
71h	Reserved
72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..
76h	Reserved
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved
7Fh	Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: ◆Clear EPA or customization logo.
80h	Reserved
81h	Reserved
82h	Call chipset power management hook. Recover the text fond used by EPA logo (not for full screen logo) If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	USB final Initialization NET PC: Build SYSID structure Switch screen back to text mode Set up ACPI table at top of memory. Invoke ISA adapter ROMs Assign IRQs to PCI devices Initialize APM Clear noise of IRQs.

Table 6.3. POST Codes ***< 5 / 5 >***

POST (hex)	Description
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	Enable L2 cache Program boot up speed Chipset final initialization. Power management final initialization Clear screen & display summary table Program K6 write allocation Program P6 class write combining
95h	Program daylight saving Update keyboard LED & typematic rate
96h	Build MP table Build & update ESCD Set CMOS century to 20h or 19h Load CMOS time into DOS timer tick Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

COM I/O Address and Register Function

The following table lists the I/O addresses in case of COM 1.

Table 6.4. I/O Address

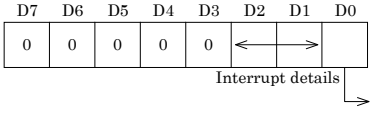
I/O address	DLAB	Read/Write	Register	
03F8H	0	W	Transmitter holding register	THR
		R	Receive buffer register	RBR
	1	W	Divisor latch register	DLL
03F9H	1	W	Divisor latch register	DLM
	0	W	Interrupt enable register	IER
03FAH	X	R	Interrupt ID register	IIR
03FBH	X	W	Line control register	LCR
03FCH	X	W	Modem control register	MCR
03FDH	X	R	Line status register	LSR
03FEH	X	R	Modem status register	MSR
03FFH	X	R/W	Scratch register	SCR

DLAB (Divisor Latch Access Bit): The value in bit 7 of the line control register.

Table 6.5. Function of Each Register ***< 1 / 4 >***

I/O address	Description
03F8H	THR: Transmitter Holding Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Register dedicated to write transmitted data to
03F8H	RBR: Reciever Buffer Register [DLAB=O] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Register dedicated to read received data from
03F8H	DLL: Divisor Latch (LSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Baud rate setting register (LSB)
03F9H	DLH: Divisor Latch (MSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Baud rate setting register (MSB)
03F9H	IER: Interrupt Enable Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 0 0 0 0 EMS ELSI ETHREI ERDAI ERDAI: Received data Interrupt enable ETHREI: Received data register empty Interrupt enable ELSI: Receiver line status Interrupt enable EMS: Modem status interrupt enable [Always used at 0.] 1: Enable interrupt 0: Disable interrupt

Table 6.5. Function of Each Register ***< 2 / 4 >***

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FAH</td><td>
IIR : Interrupt Identification Register


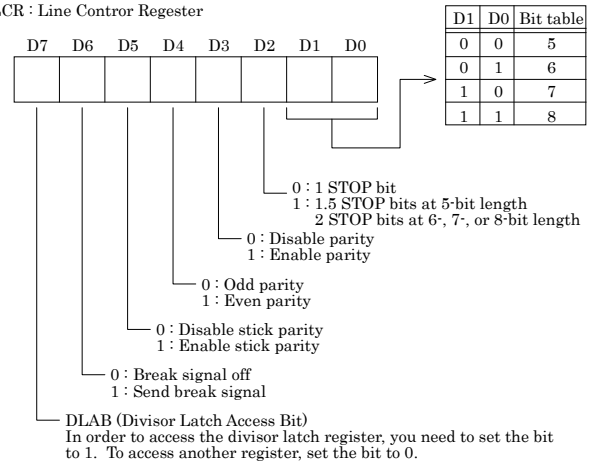
<table>
<tr><th>bit2</th><th>bit1</th><th>bit0</th><th>Priority</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>——</td><td>Interrupts are not generated.</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1 (high)</td><td>Generated by overrun, parity, framing error or break interrupt.
Cleared when the line status register is read.</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>2</td><td>Generated when the receive buffer register is ready.
Cleared when the receiving buffer is read.</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>3</td><td>Generated when the transmitter holding register is empty. Cleared when the IIR is read or when transmitted data is written to THR.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>4 (low)</td><td>Modem status interrupt is generated.
(CTS, DSR, RI, CD)
Cleared when the modem status register is read.</td></tr>
</table>
</td></tr>
<tr><td>03FBH</td><td>
LCR : Line Contror Regester

D7 D6 D5 D4 D3 D2 D1 D0
D1 D0 Bit table
0 0 5
0 1 6
1 0 7
1 1 8
0 : 1 STOP bit
1 : 1.5 STOP bits at 5-bit length
2 STOP bits at 6-, 7-, or 8-bit length
0 : Disable parity
1 : Enable parity
0 : Odd parity
1 : Even parity
0 : Disable stick parity
1 : Enable stick parity
0 : Break signal off
1 : Send break signal
DLAB (Divisor Latch Access Bit)
In order to access the divisor latch register, you need to set the bit to 1. To access another register, set the bit to 0.
</td></tr>
</table>

Table 6.5. Function of Each Register ***< 3 / 4 >***

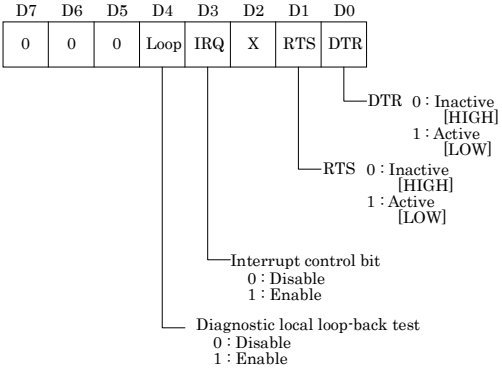
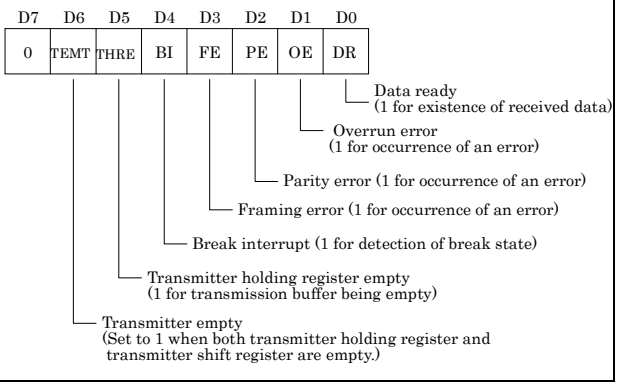
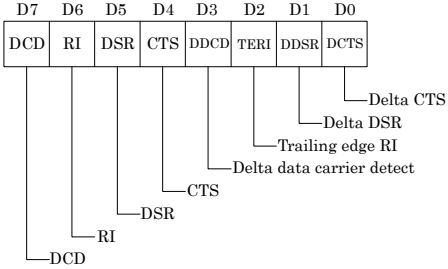
I/O address	Description
03FCH	MCR: Modem Control Register 
03FDH	LSR: Line Status Regester 

Table 6.5. Function of Each Register ***< 4 / 4 >***

I/O address	Description
03FEH	MSR : Modem Status Register 
03FFH	SCR : Scratchpad Register This is an 8-bit, readable/writable register which is available to the user to allow data to be saved temporarily.

Baud Rate Settings

A baud rate is set by software by dividing the clock input (1.8432MHz). The baud rate in terms of hardware can be set to a maximum of 115,200 bps for SERIAL1, 2, 3. The baud rates available in practice depend on the operating environment (cable, software, etc.). The table below lists typical baud rates and their respective values to be written to the divisor latch register (LSB, MSB).

Table 6.6. Baud Rate Settings

Baud rate to be set	SERIAL1, 2, 3 Clock input (1.8432MHz)	
	Value to be set in the divisor register (Decimal)	Setting error (%)
50	2304	---
75	1536	---
110	1047	0.026
134.5	857	0.058
150	768	---
300	384	---
600	192	---
1200	96	---
1800	64	---
2000	58	0.69
2400	48	---
3600	32	---
4800	24	---
7200	16	---
9600	12	---
14400	8	---
19200	6	---
28800	4	---
38400	3	---
57600	2	---
76800	---	---
115200	1	---
153600	---	---
230400	---	---

Example : To set 9,600 bps, write "00" to the (MSB) divisor latch register and "12 (decimal)" to the (LSB) divisor latch register.

Watch-Dog-Timer

The watchdog timer serves as a safeguard against possible system lock-up in your industrial computer system. In most industrial environments, there are heavy equipment, generators, high-voltage power lines, or power drops that have adverse effects on your computer system. For instance, when a power drop occurs, it could cause the CPU to come to a halt state or enter into an infinite loop, resulting in a system lock-up.

The application software created by user with the watchdog timer enabled, a RESET automatically generated unless the software periodically triggers the timer within the setting time-out interval. That is, while the system gets hung up, the running program can't trigger the timer periodically. The timer will generate a reset signal to reboot the system. This feature allows a running program to restart in an orderly way when a power glitch or any abnormal condition occurs.

The watchdog timer comes with 255-level time-out interval, 1 - 255 seconds per interval, which can be adjusted by software setting. There is a tolerance of 2 second for this time-out interval. To maintain the normal system operation, trigger the timer periodically by the user-created program in consideration of the tolerance.

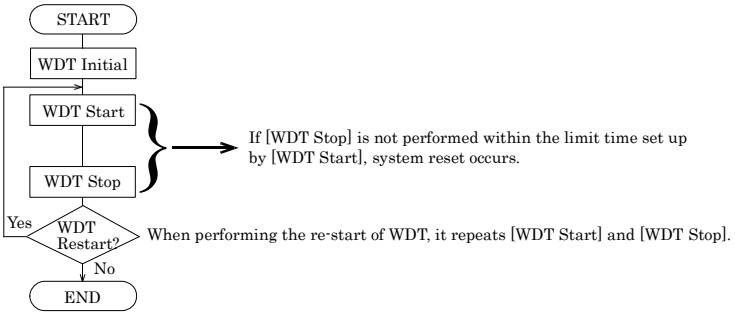
CD-ROM [IPC-SLIB-01], which is bundled with this product, contains a sample program for the watchdog timer. To view the sample program for the watchdog timer, decompress "HWMandRTCut.zip", which is found under \RasUtility\Samples\Module.

Ex.) If the time-out interval is set to 30 seconds, the user-created program must retrigger the watchdog timer before 28 seconds will have elapsed in consideration of the tolerance. If the program failed to retrigger the timer (if 28 - 32 seconds have elapsed), the system will automatically reboot.

The I/O port is defined at address 2e/2fH. You can trigger/enable disable the timer by writing address 2e/2fH.

Here is an example for flow chart and programming how to use the watch-dog-timer.

(1) Example flow chart


START
WDT Initial
WDT Start
WDT Stop
If [WDT Stop] is not performed within the limit time set up by [WDT Start], system reset occurs.
Yes
WDT Restart?
When performing the re-start of WDT, it repeats [WDT Start] and [WDT Stop].
No
END

* It is also possible not to perform [WDT Stop] instead of performing [WDT Stop] to [WDT Start], but to perform [WDT Start] continuously at the time of a re-start.

(2) Example programming

The following example is written in Intel8086 assembly language.

```
;===============
;<WDT Initial>
;===============
;-----------------------------------------
;Enter the extended function mode
;-----------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-------------------------------------
;Set WDT function at pin89
;-------------------------------------
MOV DX,2EH
MOV AL,2BH
OUT DX,AL
MOV DX,2FH
MOV AL,0DH
OUT DX,AL
;-------------------------------------------------
;Select logical device WDT(number 8)
;-------------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-------------------------------------------------
;Activate logical device WDT(number 8)
;-------------------------------------------------
MOV DX,2EH
MOV AL,30H
OUT DX,AL
MOV DX,2FH
MOV AL,01H
OUT DX,AL
;-------------------------------------
;Set timer unit : second
;-------------------------------------
MOV DX,2EH
MOV AL,F5H
OUT DX,AL
MOV DX,2FH
MOV AL,00H
OUT DX,AL
;-----------------------------------------
;Exit the extended function mode
```

```
;-----------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL

;================================
;<WDT START : counter set and a start >
;================================
;-----------------------------------------
;Enter the extended function mode
;-----------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-----------------------------------------------
;Select logical device WDT(number 8)
;-----------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-----------------------------------------------
;Set time of WDT and start to count down
;-----------------------------------------------
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
;-------------------------------------------------------------------------------
;The data of an example is 15 seconds.(01H=1sec.- FFH=255sec.)
MOV AL,0FH      ; 0FH = 15Sec.
;-------------------------------------------------------------------------------
OUT DX,AL
;-----------------------------------
;Exit the extended function mode
;-----------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL

;==============
;<WDT STOP>
;==============
;-----------------------------------
;Enter the extended function mode
;-----------------------------------
MOV DX,2EH
MOV AL,87H
```

```
OUT DX,AL
OUT DX,AL
;-------------------------------------
;Select logical device WDT(number 8)
;-------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-------------------------------------
;Stop count down of WDT
;-------------------------------------
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
;-------------------------------------
;The data of 00H is stop WDT
MOV AL,00H
;-------------------------------------
OUT DX,AL
;-------------------------------------
;Exit the extended function mode
;-------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

⚠ CAUTION

The timer's intervals have a tolerance of ±2 seconds.

Life of CF

About write endurance

CF contained in IPC-BX950TxD-DCxxF has a write endurance which limits the number of times each memory may be written, due to the characteristic of the memory that is used. Write endurance can be calculated by the following formula as a reference value:

Write endurance (cycles) =
Total capacity (MB) x 100,000 (cycles) / Size of file (MB)

Example1: When the file of 1MB is made for the standard CF (2GB) for IPC-BX950T1-DC55F, and it rewrites it once a second.

Write endurance = 1920MB x 100,000 cycles / 1MB = 192,000,000 (cycles)
Longevity = 192,000,000 / (3600 x 24 x 365) ≅ 6 (year)

After all these are reference values, confirm its life span by the following S.M.A.R.T.

About S.M.A.R.T.

A self-diagnosis program "SMART" that can obtain the S.M.A.R.T information in a CF is available for download at TDK website. Following information can be obtained using this program:

1. Number of flash memory chips mounted inside CF, and the total number of blocks
2. Total number of write cycles on CF
3. Number of write cycles of the block where rewriting occurs most frequently
4. Number of write cycles of the block where rewriting occurs least frequently
5. Number of write cycles of all the blocks (10 step histogram)

The NAND type flash memory's life span is 100,000 cycles. The number of write cycles for each block can be determined, making it possible to predict life span.

TDK website:

http://www.tdk.co.jp

At the SMART program download destination:
http://www.tdk.co.jp/memorycontroller/mem01000.htm

Requirement for SMART program:

Windows 2000/XP with VB6.0 runtime and MSFLXGRD.OCX component
(Such as vb6rt330.exe)

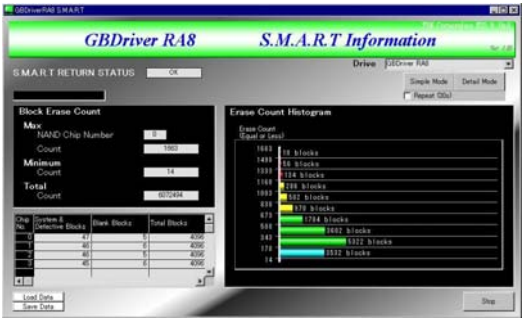


Figure 6.2 S.M.A.R.T.

Battery

Battery Specification

This product uses the following battery.

- Type : Lithium primary battery
- Model : BR-2/3A
- Maker : Panasonic
- Nominal voltage : 3V
- Nominal capacity : 1200mAh
- Lithium content : 1g or less

Removing the battery

Remove a cover from the product (Screw 12pcs.). Remove the screws (2pcs.) which fix the battery and pull out the battery from its connector.

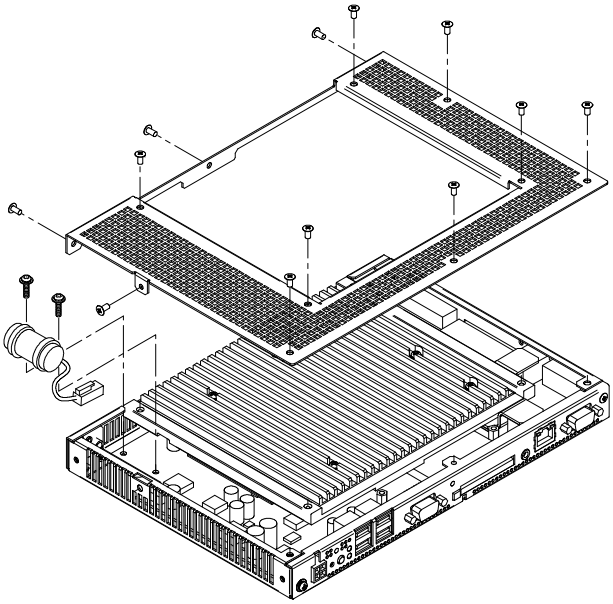


Figure 6.3 Removing the battery

Disposing the battery

Dispose the removed battery properly as instructed by local government.

7. List of Options

CF Card

- CF-1GB-B 1GB CompactFlash for Fix Disk
- CF-2GB- B 2GB CompactFlash for Fix Disk
- CF-4GB- B 4GB CompactFlash for Fix Disk
- CF-8GB- B 8GB CompactFlash for Fix Disk

AC adapter

- IPC-ACAP12-03 AC adapter (Input: 100-240VAC, Output: 12VDC 4A)

Bracket

- BX-BKT-VESA01 Bracket for VESA (“75 x 75” - “400 x 200”)

TFT color liquid-crystal display

<Analog RGB types>

- FPD-H21XT-AC (15 inch 1024 x 768 dots, Panel mounted type)
- FPD-L21ST-AC (12.1 inch 800 x 600 dots, Panel mounted type)
- FPD-M21VT-AC (10.4 inch 640 x 480 dots, Panel mounted type)

< LVDS&DVI input type >

- FPD-H71XT-DC1 *1 (15inch 1024 x 768 dots, Panel mounted type)
- FPD-L71ST-DC1 *1 (12.1inch 800 x 600 dots, Panel mounted type)
- FPD-S71VT-DC1 *1 (6.4 inch 640 x 480 dots, Panel mounted type)
- FPD-H75XT-DC1 *1 (15inch 1024 x 768 dots, Embedded type)
- FPD-L75ST-DC1 *1 (12.1inch 800 x 600 dots, Embedded type)
- FPD-L75ST-DC1 *1 (10.4inch 640 x 480 dots, Embedded type)

*1 Please purchase the optional connection cable [FPD-26M26M-005, FPD-26M26M-020, FPD-26M26M-050].

Display cable only for LVDS

- FPD-26M26M-005 LVDS Cable (0.5m)
- FPD-26M26M-020 LVDS Cable (2m)
- FPD-26M26M-050 LVDS Cable (5m)

IPC-BX950 Series

User's Manual

IPC-BX950T1-DC5xx
IPC-BX950T2-DC4xx
IPC-BX950T3-DC5xx

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